NOV 24 1924

AUTOMOTIVE INDUSTRIES
The AUTOMOBILE

Vol. 51
Number 21

PUBLISHED WEEKLY AT 239 WEST 39th STREET
NEW YORK, NOVEMBER 20, 1924

35c. a copy
$3.00 a year

TERNSTEDT

WORLD'S LARGEST MANUFACTURERS OF AUTOMOBILE BODY HARDWARE

Almost any body hardware equipment, *when new*, will serve its purpose.

But, give it a run of months under actual working conditions—

That will tell you how good it is—whether or not it is a Ternstedt *proved-in-service* product.

TERNSTEDT MANUFACTURING COMPANY . . . . DETROIT
Division Fisher Body Corporation

Entered as second-class matter Jan. 2, 1902, at the post office at New York, N. Y., under the Act of March 3, 1879

The Largest Engine Bearing Manufacturers in the World

DOING but one thing and doing it well, making a better product, selling the product at fair prices, fair dealing, reliability, those are the ingredients that have made this business possible. Those, we believe, are the business principles that have caused more automobile manufacturers, engine builders and tractor manufacturers to look to Federal-Mogul Corporation for their engine bearings.

The concentration of this great volume of business at one point, under one management, is a great advantage to the buyer.

It permits the employment of the best brain power and the purchase of the finest of mechanical equipment. With this backing, better products, better service and the best possible prices are sure to result.

See the Federal-Mogul complete line exhibit at the New York and Chicago Automobile Shows

The Federal-Mogul Complete Line

Bronze Back Babbitt Lined Bearings

Die Cast Babbitt Bearings and Bushings

Bronze Bushings

Bronze Washers

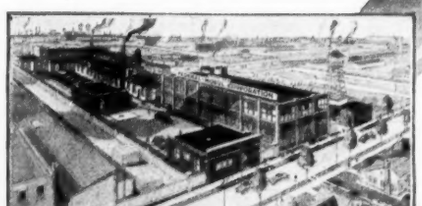
Bronze Castings

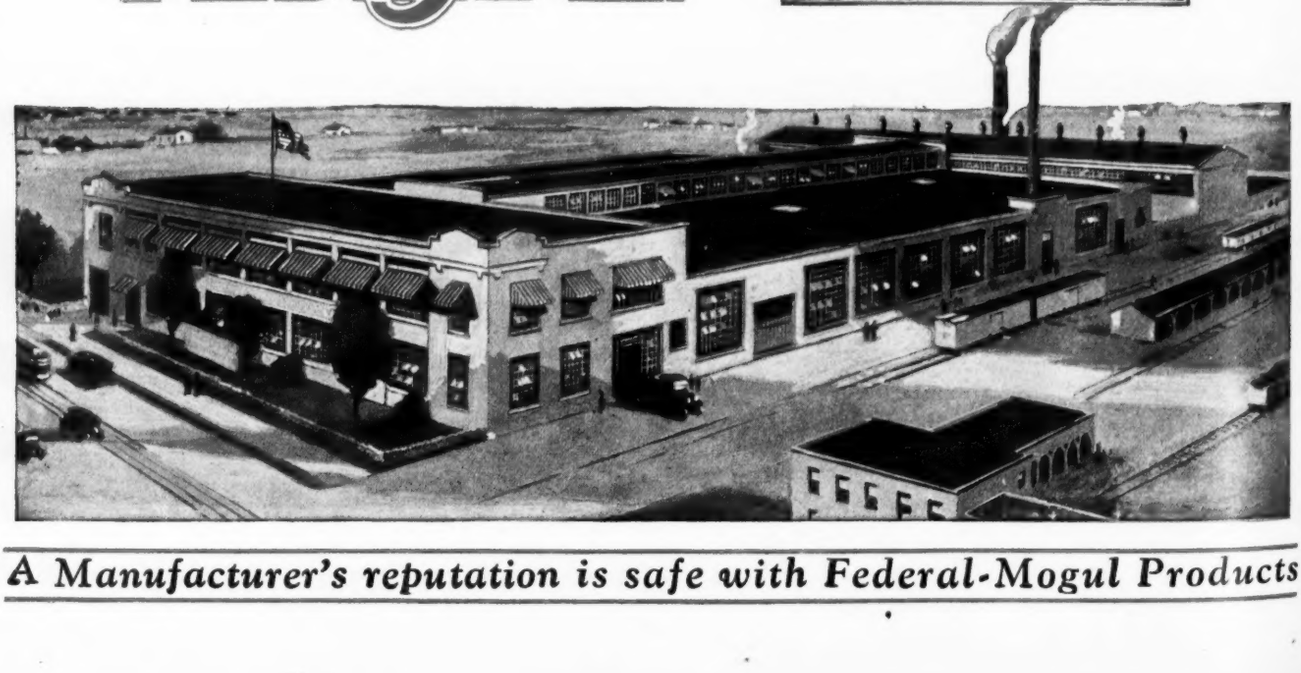
Babbitt Metals

Bronze Cored and Solid Bars

FEDERAL-MOGUL CORPORATION, DETROIT, MICH.
A consolidation of the Muzzy-Lyon Co. and Federal Bearing & Bushing Corp.

Mogul FEDERAL





A Manufacturer's reputation is safe with Federal-Mogul Products

AUTOMOTIVE INDUSTRIES
The AUTOMOBILE

VOL. 51 NEW YORK—THURSDAY, NOVEMBER 20, 1924 NO. 21

Steady!—Is Present Watchword on Car Prices

Further increases unlikely, but leaders of industry see no basis for general reductions. Profit margins already small. Competitive conditions may cause a few cuts.

By Norman G. Shidle

PASSENGER car prices are on the carpet again. Talk about them hasn't been loud nor voluminous, but those with superheterodyne sensibilities receiving apparatus have been able to tune in on numerous murmurings, sufficiently distinct to be pretty well understood. The clearest of these is the statement of Alfred P. Sloan, president of the General Motors Corp., that prices are not going to be reduced in the General Motors line.

Recent cuts by Hudson, Essex, Moon and on one model by Willys-Overland generated the rumor in some parts of the industry that further reductions would be in order. Dealers handling competitive makes in some parts of the country report sales temporarily affected by the decreases mentioned, although no definite or strong desire for reductions is apparent in retail organizations in general. Mr. Sloan's statement settles the price question as regards General Motors' cars for the time being. Most executives in other organizations seem to be in accord with his ideas on prices, although the possibility of scattering decreases by highly competitive lines is admitted in some quarters.

"PRESENT conditions from both sales and manufacturing standpoints do not justify reductions in passenger car prices. We do not look for changes either up or down for some time.

"Price reductions now would only serve to disturb trade and stop retail buying generally."

This statement is typical of opinions expressed on the price situation by leading executives in the industry. Its conclusions are confirmed by study of business facts as they exist today. Here's the whole story in brief.

Nothing in the basic economic situation seems to justify or require automobile price reductions at this time. With the election over and immediate political uncertainty removed as a factor in business, there isn't any reason to think that sales are going to get worse; there are many reasons to believe that they will get better, seasonal conditions considered.

FACTORIES are not operating at capacity, of course, but past experience has shown clearly that an orgy of price cutting usually has little power to increase production in individual plants. Temporary stimulation often is achieved in certain cases, but after the downfall of prices has ceased, the relative position of particular companies usually is found to be about the same as before, the only difference being that prices in general have stabilized on a lower level. Thus, price cutting due purely to competitive conditions and not to lower material costs or decreased expenses rarely achieves any real change in manufacturing schedules. It does change profit and loss sheets very frequently—usually for the worse.

It is important that a distinction be made

between price decreases demanded by economic conditions and those resulting from an attempt to gain a temporary sales advantage. The decreases following the war were of the first type and were in line with desirable and necessary readjustment within the industry. The latter type usually generates more confusion than advantage.

The chief factors involved in justifiable price reductions are:

Raw material costs
Parts costs
Production efficiency
Sales efficiency
General overhead costs.

HAS any one of these five factors changed sufficiently in the last few months to necessitate or justify a lowering of automobile prices at this time?

Let's look them over.

Turning the list upsidedown, the last two may be dismissed quickly. The cost of selling is going up rather than coming down. General overhead costs have not been reduced materially in the last six months, although slow progress along this line is taking place in the industry as a whole.

Production efficiency can be dismissed almost as quickly. It would be foolish to say that further manufacturing economies are not to be expected in the automotive industry, but it would be just as foolish to claim that any changes which have taken place recently are big enough to affect the price of the finished vehicle by more than a very few dollars. Savings in the shop are being made today in connection with a multitude of small items, no one of which is likely to represent more than a fraction of 1 per cent of the total cost.

Marked progress has been made, of course, in closed body construction and these improvements already have been reflected in closed car prices during the last few years. It is possible that further decreases may come through on this score.

IF price cuts were to be made, then, they would have to come out of the parts makers or the raw material producers.

Parts manufacturers in general would have a tough time of it if they had to lower their prices any further. Many of them already are down to rock bottom and more than one is operating almost without profit in hopes that a better time is coming. Every expression that has come from parts executives in the last few months has indicated a determination to get a better price for original equipment units if possible and to hold firm on present prices at all costs.

THIS doesn't mean that parts prices in some instances wouldn't be shaved down even lower than they are now if sufficient pressure were brought to bear. Competition and commercial necessity have performed miracles in the past and probably will do so again in the future. Consequently, only a very rash prophet would make definite predictions about a question of this kind. It's not in the cards, however, for price cuts to be taken out of the parts makers and it would not be to the permanent advantage of the industry if an attempt were made to do so.

Certainly the parts industry could not be expected to get very enthusiastic about a reduction in car prices at this time.

That leaves the raw material market to be accounted for. Here, again, little appears to justify price cuts. True, the automotive raw materials index took a slight drop in October, but its fall of only three points certainly was not sharp enough to cause much excitement. The index figure for October, 1924, was 7 per cent lower than that for October, 1923.

ON the other hand, there seems to be considerable likelihood that the price of steel, perhaps the most important of the raw material items, will advance in the near future. At least, the steel companies probably will make an effort to get more for their product, since many of them, outside of the U. S. Steel Corporation, have had considerable difficulty in making profits for some time.

The views of automotive executives correspond very largely to the inevitable conclusions of this analysis that basic economic factors do not demand price cuts at this time and that any reductions which do come through may be attributed to an attempt to gain some temporary sales advantage.

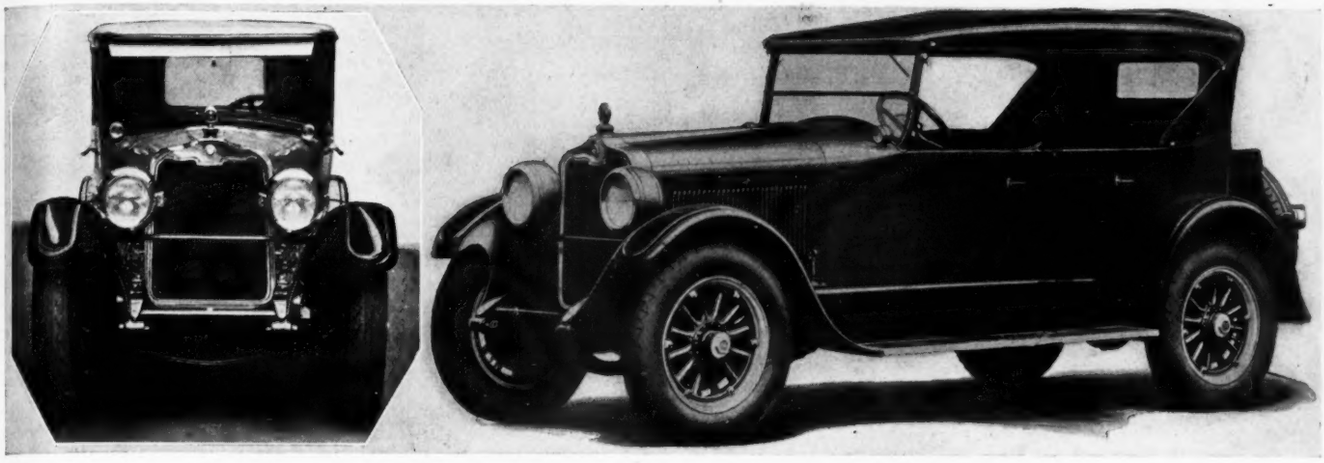
Suppose Prices Were Cut—

JUST because of keen competition; even though buying and manufacturing conditions don't warrant a cut.

One company cuts to gain a temporary advantage. Another follows. Then another and another.

In the end the number of cars sold by individual companies is about the same as if no reductions had been made. But prices are stabilized on a new low level.

Profits suffer and production isn't increased.



Showing the new hood and radiator lines. Standard finish is Peerless blue, but certain other colors or combinations are optional at no additional cost

Straighter Body Lines and Re-designed Engine Characterize New Peerless Eight

Detachable cylinder head construction has been adopted, and timing and explosion sequence have been changed. Heavier crankshaft with counterweights and larger bearings used.

By Donald Blanchard

AN inherent balanced V-type engine and an entirely new line of seven body models are the outstanding features of the new Peerless Equipoised Eight. The appearance of the car has been radically altered and improved by a complete redesign of the radiator and hood lines. Hydraulic four-wheel brakes and 33 x 6.60-in. balloon tires are regular equipment. An important improvement, particularly from the maintenance standpoint, is the adoption of the detachable head construction. In other respects the new chassis is substantially the same as the former model.

A counterweighted, two plane crankshaft is responsible for the inherent balance of the new engine. In this shaft, crank throws 2 and 3 lie in a plane at right angles to that of throws 1 and 4. Formerly all four throws were in the same plane, the general layout being the same as for the crankshaft of a four-cylinder engine.

Four Forged Steel Counterweights Used

With the new crankshaft the unbalanced forces caused by the inertia of the reciprocating parts are of such character that they may be equalized by counterweights attached to the crankshaft. In the Peerless design there are four forged steel counterweights which are secured to the shaft by means of nickel steel bolts. These counterweights are of such size and are so placed on the shafts that they set up forces which are equal and opposite in direction to those produced by the inertia of the reciprocating parts and consequently the two sets of forces neutralize each other. A graphical analysis of this method of balancing was given in AUTOMOTIVE INDUSTRIES of Sept. 13, 1923, page 519.

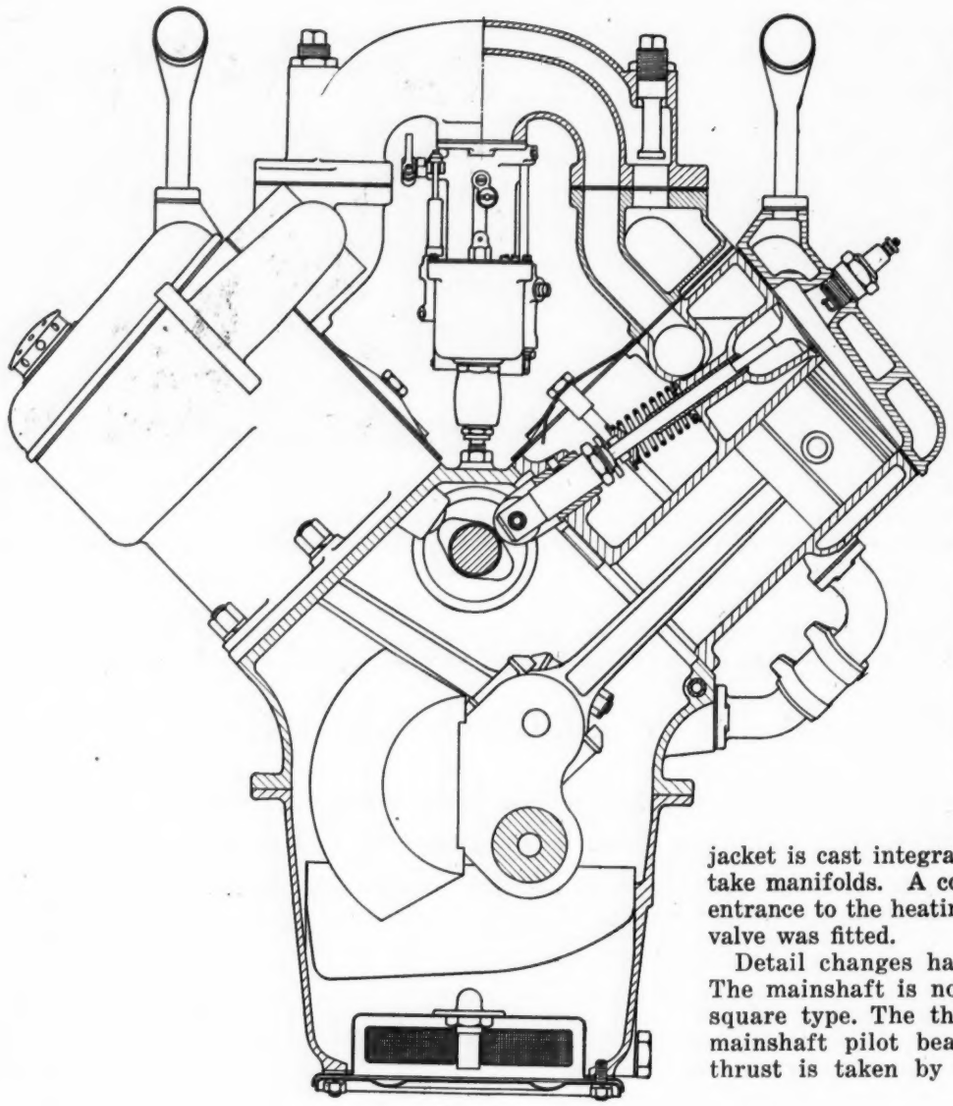
The new crankshaft is considerably heavier and stiffer than the old, the bearing dimensions now being:

		Diameter	Length
Main bearings,	Front	2¼ in.	2⅞ in.
	Center	2¼ in.	3 in.
	Rear	2¼ in.	3¾ in.
Crankpin,		2⅛ in.	3 in.

The new type of crankshaft has naturally altered the firing order and the sequence of explosions now is 1-R, 1-L, 4-R, 4-L, 2-L, 3-R, 3-L, 2-R. To secure more nearly uniform distribution of mixture to all cylinders the valve timing has also been changed. A comparison between the new and the old follows:

	New	Old
Inlet opens	Top dead center	22 deg. before top dead center
Inlet closes	47 deg. after B.D.C.	70 deg. after B.D.C.
Exhaust opens	47 deg. before B.D.C.	70 deg. before B.D.C.
Exhaust closed	Top dead center	22 deg. after T.D.C.

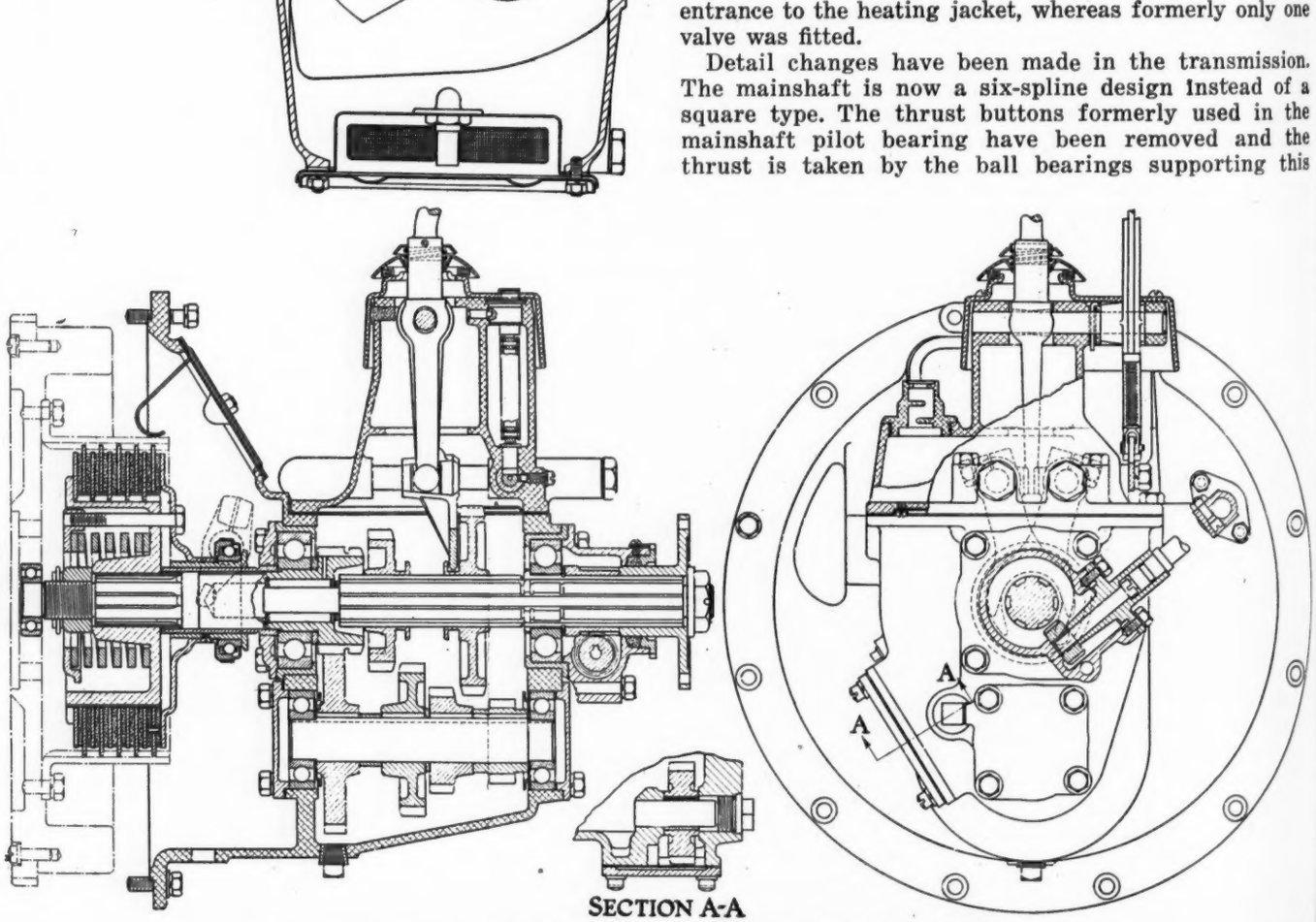
The intake valves are siamesed, and reference to the firing order shows that there is a period when intake valves 1 and 2 are both open simultaneously. With the old firing order this overlap amounted to 182 deg., but with the new it is only 137 deg. To compensate for the reduction in the intake valve opening period from 272 deg. to 227 deg., the constant acceleration type of cam was adopted. With this type of cam the valve reaches its maximum opening more quickly and the dwell is longer than with the former camshaft, despite the fact that the intake valve completes its cycle in 45 deg. less crankshaft travel. It is said that exhaust gas analysis shows a high degree of uniformity of mixture distribution with the new design and that the improved torque characteristics of the engine, especially at low speeds, show that higher volumetric efficiencies are attained. No change has been made in the compression ratio.



With the detachable head construction the combustion chambers are completely machined, which insures practically uniform compression volumes with consequent improvement in the smoothness of the engine. More uniform cooling is also attained. The detachable head construction differs from the conventional in that the split is not perpendicular to the cylinder bores. This design was made necessary by the fact that the valves are set at an angle to the cylinders so that they may be operated directly from the camshaft without the use of rocker arms. With this valve arrangement the conventional practice could not be allowed.

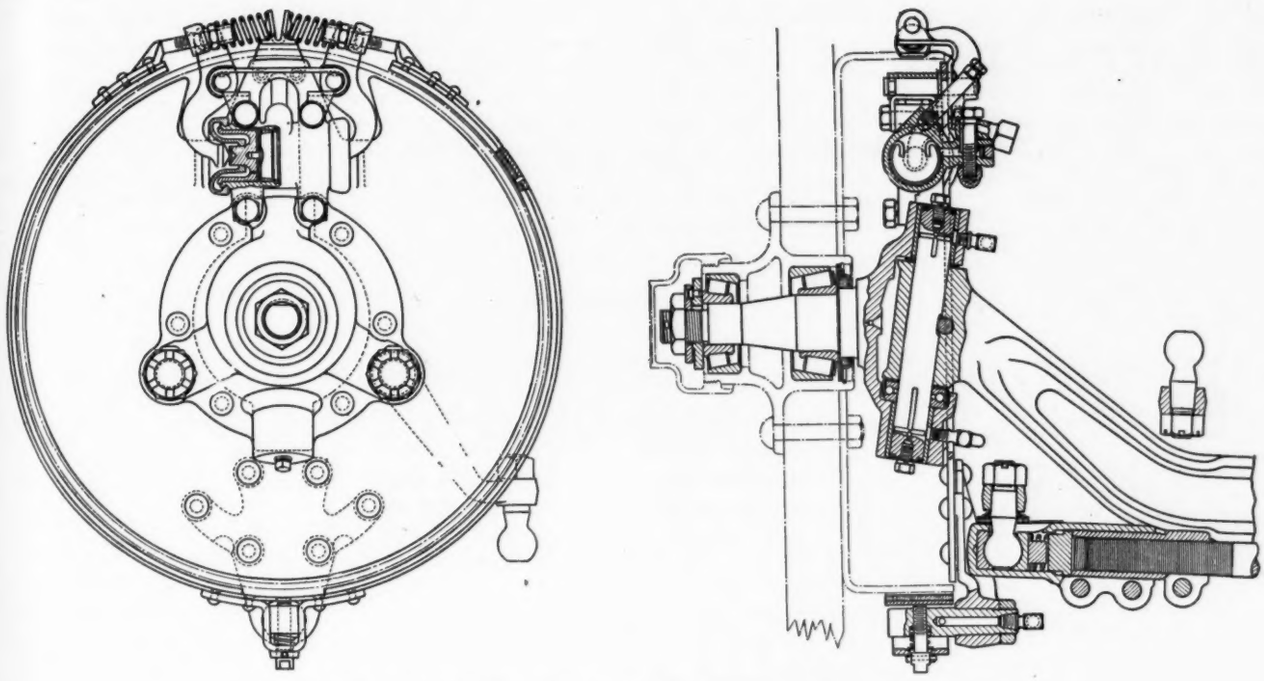
A 1½-in. plain tube Stromberg carbureter is now used as regular equipment. Heat is supplied to the mixture in the same manner as in the former model, but a control feature has been added so that the heating jacket may be entirely cut off from the exhaust manifolds. The heating jacket consists of a header connecting the exhaust manifolds on the two blocks. This jacket is cast integral with the header connecting the intake manifolds. A control valve is now provided at each entrance to the heating jacket, whereas formerly only one valve was fitted.

Detail changes have been made in the transmission. The mainshaft is now a six-spline design Instead of a square type. The thrust buttons formerly used in the mainshaft pilot bearing have been removed and the thrust is taken by the ball bearings supporting this



SECTION A-A

Above—Cross section through the Peerless eight-cylinder engine which has a detachable head. Below—Peerless clutch and transmission assembly views



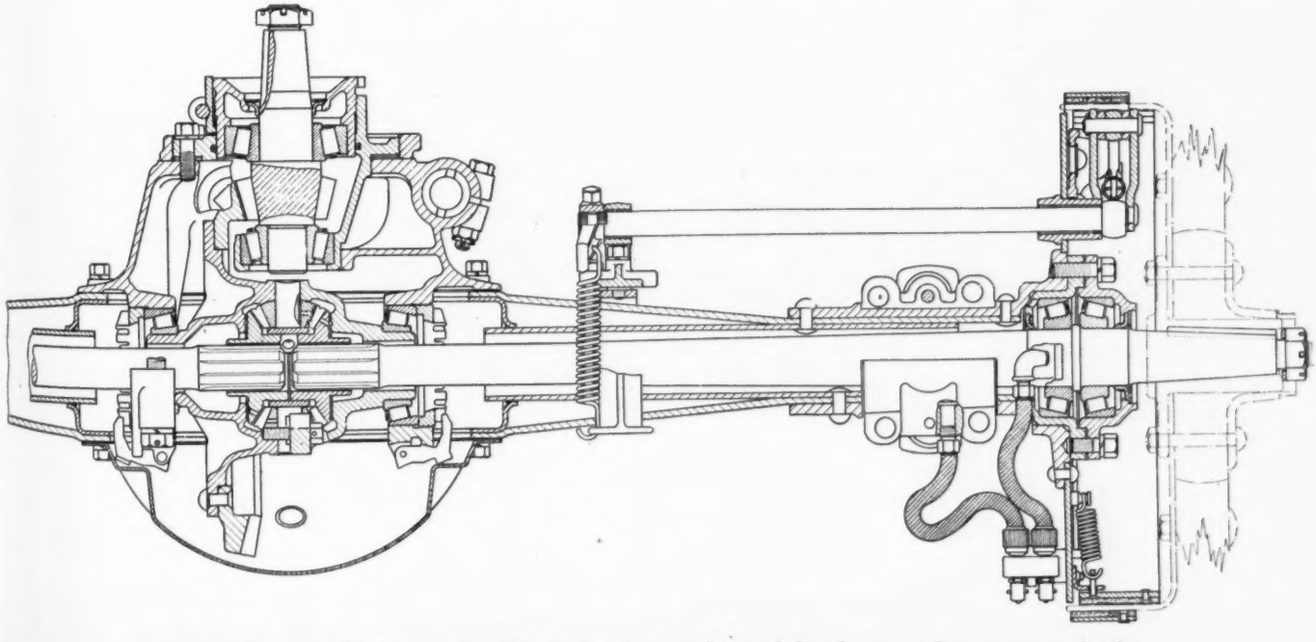
Front axle end showing details of the Lougheed hydraulic brakes

shaft. The inner races of these bearings are rigidly secured against endwise motion, the new construction being shown in detail in the accompanying drawing.

The axles, both front and rear, are Timkens. They are exactly the same as used on the former model when furnished equipped with hydraulic four-wheel brakes and balloon tires. The king pins are inclined transversely, but the axle is practically vertical, the caster being only ¾ deg. Ball thrust bearings are provided on the pivots. The steering gear reduction is now 11½ to 1, as compared with the 9½ to 1 gear furnished with high pressure tires. The rear axle is a semi-floating type with opposed taper roller bearings at the wheels. The pinion shaft is straddle mounted in taper roller bearings. Both pinion shaft bearings and the clearance between pinion and ring gear may be adjusted from outside the axle. Rear springs now have 10 and 11 leaven on open and closed models respectively, as compared with 8 and 9 leaves used previously.

Prices on the new line four-passenger phaeton, $3,285; five-passenger town brougham, $4,250; seven-passenger berline limousine, $4,725; seven-passenger suburban sedan, $4,450; five-passenger coupe, $4,175; four-passenger victoria, $3,950, and five-passenger sedan, $4,250. The standard finish is Peerless blue, but options of coach painter's blue, desert brown, beige brown, scotch gray and Brewster green with striping on bodies, hoods and wheels to match, are offered at no additional cost. The phaeton is upholstered in leather and in the closed models an option of velour or broadcloth is offered.

The instruments are now grouped in two oval panels on opposite sides of the lighting and ignition switch,



Rear axle assembly view, showing hydraulic service and hand-operated emergency brake

which also has an oval base. In the right panel are located the ammeter, oil gage and gasoline gage, and the left panel is a combination speedometer and clock.

Regular equipment includes tire carrier and lock, nickeled radiator shell, nickeled hood center hinge, tool compartment with lock, snubbers front and rear, automatic windshield cleaner, combination tail, stop and backing light with nickeled shell, cowl ventilator, inspection lamp with extension cord, motometer and rubber running board mats with integral step mats. The stop and backing lights are thrown on automatically when the brake pedal is depressed in the case of the former and when the gearshift lever is put in reverse in the case of the latter. Closed models have adjustable sun visors and one-piece windshields. The shells of the head and side lights are of solid nickel alloy and consequently their finish can be maintained indefinitely by polishing.

Heat Flow in Internal Combustion Engines and Physical Properties of Structural Materials Discussed at S. A. E. Section Meetings

A PAPER on Heat Flow in Internal Combustion Engine Pistons was presented at the monthly meeting of the Indiana Section of the S. A. E. on the 14th inst. by Prof. G. A. Young, head of the School of Mechanical Engineering, and H. A. Huebotter, research associate of the Engineering Experiment Station of Purdue University. In this paper the heat flow in pistons is analyzed mathematically and the results thus arrived at are combined with the results of experiment. The following conclusions are arrived at:

1. The temperature in the piston head depends more upon the quantity of metal present than upon its distribution. A uniform section, however, has an advantage over both a tapered and a parabolic section.

2. The tapered barrel section is superior to the uniform section in its ability to disperse heat with minimum weight.

3. The ring belt disperses between 60 and 85 per cent of the total heat absorbed by the piston.

4. The ring belt transfers heat to the cylinder wall about 60 per cent as readily as the plain portion of the piston barrel.

5. In view of the low heat dissipating property of the ring belt, a broad band in contact with the cylinder at the head end of the barrel should be of material assistance in cooling the piston. By reason of this better cooling, it should not require the large clearance usually given to the top band in present designs, although the determination of the clearance is admittedly a delicate matter. Such a band would also help to support the piston and permit the use of a shorter barrel.

6. Improvement in the thermal contact between the rings and the piston barrel will assist in lowering the piston temperature.

7. In gray iron pistons a close grained iron in which the graphite is finely divided and uniformly distributed should be used, on account of its uniform high thermal conductivity.

Further research work, particularly on pistons with deeply ribbed heads, is contemplated.

Buffalo Section Meeting

AT the monthly meeting of the S. A. E. Buffalo Section on the 4th inst., H. F. Moore, research professor of engineering materials, University of Illinois, gave a paper on the significance of the Common Physical Properties of Structural Materials.

The author discussed the various tests generally made on materials of construction and the significance of their results. He does not seem to think very highly of the notched bar test, because of the difficulty of correctly interpreting the results, and quoted an engineer of a large steel company to the effect that it is an excellent method of determining whether a steel will show up well in a notched bar test.

As regards the yield point, Professor Moore gave it as his opinion that for metals in which this point is well marked, it connotes the beginning of serious plastic action under stress and fixes the practical limit of the static strength of such metals for use in most structural members and machine parts. For metals having no clearly defined yield point but with a fairly well defined elastic limit, the latter fixes the practical limit of static strength for metal for most machine parts and structural members.

The endurance limit, the author said, seems to be a reliable index of the ability of a material to withstand oft-repeated stress of a given magnitude. Taken alone, the endurance limit is not an index of the resistance of a material to occasional severe overstresses followed by oft-repeated normal stress. Professor Moore gave it as his opinion that insistence on ductibility in material for structural or machine parts, as measured by elongation or reduction of area, is justified—not as an assurance of strength, but as an assurance against sudden chattering fracture under static load and as partial protection against reduction of fatigue resistance by occasional accidental overload.

Hoover Reviews Business Conditions

IN a review of business conditions for the year ending June 30, 1924, made public at the Department of Commerce today, Secretary Hoover says:

"The outstanding features of the fiscal year were: first, the advance in agricultural prices, which has lagged behind industry since the slump of 1920; second, the beginnings of sound policies in German reparations, and third, the complete recovery of our own industry and commerce (aside from agriculture), great stability of prices, high production, full employment, expanding foreign trade and prosperity throughout the business world. There were some moderate decreases in activity of some lines during the latter part of the fiscal year, but since its close there has again been general recovery in those lines."

THE Lincoln Motor Co. has inaugurated an exchange policy on crankshafts under which the dealer can turn in a worn shaft and secure in return a unit reground 0.02 in. undersize. The cost of the reground shaft to the customer is $15 exclusive of labor for installation and undersize bearings. Only such crankshafts are exchanged on this basis as will clean up when reground to 0.02 in. undersize.

Just Among Ourselves

Export Sales Hard to Predict

THE necessity for making predictions is always with us. Even in connection with foreign sales, guesses about the future have to be made despite the very meager data available at present to use as a basis. A movement is on foot now among some of those automotive men most interested in export selling to devise some means of forecasting overseas sales which will be at least slightly better than the present cut-and-dry methods. How successful they will be only time can tell, but the effort is significant as indicating the increasing attention being devoted to business forecasting by automotive executives.

Here's How They Do It Today

COMBINATIONS in restraint of trade no longer can exist permanently in American business. Their evil influences so far outweighed their economic values as to make them unsatisfactory members of modern industry. But the need for constructive association among competitors is greater today than ever before. The various automotive trade associations have performed a real service to business in general by showing how such cooperation can be achieved in a useful and fair way. Two recent activities of the Automotive Electric Association are interesting examples of how the modern trade association goes about trying to improve conditions as opposed to the methods which might have been attempted twenty-five years ago. This organization has developed two new booklets, each with a specific purpose. Its standardization booklet is designed to sell car makers on the idea that larger and more adequate electrical units should be installed; its service pamphlet, directed to the same audience, tells what electrical equipment men are doing to improve and extend expert facilities in specialized electric service. Thus does the modern trade association, having discarded combination, rely on sales effort for the accomplishment of its constructive ends.

Prize Winners Don't Always Win

IF somebody came up out of the subway at Times Square in New York and ejaculated, "Oh, look at all the *motocycles*," people would give him the icy stare, remark, "The poor boob's cuckoo," and continue on to their respective bootleggers. Only a few students of history would know that the term once was the official name of those four-wheeled vehicles which today are familiarly known as automobiles. When the famous *Times-Herald* race was held back in 1895, a side contest was staged in which $500 was offered as a prize for the best name to be used for the new horseless vehicles. There was considerable popular objection to the appellation "automobile," because it had come over with the cars from France and had a foreign flavor that was objectionable to the 100 per cent Americans of that day. "Motocycle" won the prize. But the name never caught on, and passed into oblivion within a few months, while "automobile" went straight ahead to its present place in the standard dictionaries.

Distributors or Direct Dealerships

THE distributer-vs.-branch argument in automobile marketing has been prominent for a good many years. About two years ago when it was under discussion with more vigor than usual, a prominent sales manager, who has been operating successfully with distributors for years, voiced the opinion that eventually most of the lower-priced cars would be handled through direct dealerships, while the higher priced lines, for the most part would still use distributors. He didn't specify a dividing line, but assuming it to be $1,500, his prediction seems well on the way toward being carried out. Only a few months ago the Durant policy was changed, while a large number of other cars selling under $1,500 have been distributed through direct dealerships for years. It would not be surprising to see at least one or two others follow suit in the very near future.

The Guess I Left Behind Me

GUESSING future automobile production has been a favorite sport for some years. Wonder how many informal prophets bother to check up their predictions to see how close they come to what actually happens? We are afflicted with the guessing bug, like most everybody else, and back on Sept. 5, 1923, we wrote ourselves a memorandum predictng that production in 1924 would not exceed a maximum of 3,250,000. The other day we ran across this prophesy while conducting the annual fall cleaning of the files in the right-hand bottom drawer of our desk. A few additional hasty calculations indicated that the 1924 total is going to exceed our maximum guess by some 350,000, making our nearest prediction a little less than 10 per cent off. By laying bare these confidential messages to ourselves we hope to encourage other guessers to check up on themselves. It would be a good thing for the industry if all of our guesses came back to their authors—often to mock but sometimes, to cheer. N. G. S.

Oil Cooled Pistons and One Overhead Camshaft Used in New 14-45 Hp. Rover

Single point lubrication for engine, clutch and gearset. Valves inclined at an angle of 45 degrees. Cylinder head is internally machined and detachable.

By M. W. Bourdon

THE Rover Co., one of the foremost British manufacturers, introduced at the Olympia Show an entirely new model in which unorthodox features of design appear in every component. It is rated at 14-45 hp. and differs in every detail from the previous 14-hp. type, which it supersedes. Its cylinder dimensions are 2.95 x 4.75 in. (158 cu. in.).

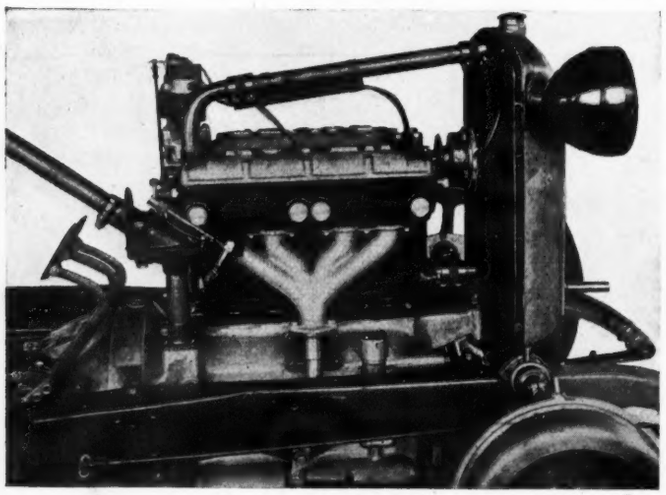
Prominent among the features in which the design is unusual is the arrangement and actuation of the overhead valves. The inlet valves on the left and the exhausts on the right are inclined at an angle of 45 deg., with the spark plugs set centrally between them. A tulip form of valve head is employed and this, with the internally machined and detachable cylinder head, affords a substantially hemispherical combustion chamber.

Despite the distance apart of the ends of the valve stems (approx. 10 in.) only one overhead camshaft is employed, which actuates the inlet valves by means of roller-ended rockers, and serves also for the exhausts through the agency of horizontal followers and tappet rods; the latter pass through cored holes in the cylinder head casting, with a bearing at each end, and act on rockers on the right-hand side.

Valve Clearance Variation Low

Among the advantages claimed for this system of valve operation is the fact that the variation of valve clearance at minimum and maximum temperatures is less than 0.002 in. and that the clearances increase, instead of decreasing, with a rise of temperature; thus it is possible to adopt a standard clearance of 0.001 for inlets and 0.002 for exhausts, which small amounts are needed to counteract variations in the camshaft.

The location of the camshaft and of the rockers enables the greater part of the valve operating details to be set in deep troughs cast with the cylinder head, wherein a constant level of oil is maintained and thorough lubrication insured for each cam without individual feeds.



Photographic view of exhaust side of engine

Another feature of note lies in the camshaft drive. This is taken through worm gearing from a point near the rear end of the crankshaft, thence via an enclosed vertical shaft to worm gearing at the upper end, where the two-to-one reduction to the camshaft is made. The worm wheel is a press fit on an enlargement of the crankshaft at the middle of the rear main journal, and is completely enclosed within a chamber into which the oil pump delivers. Thus this primary worm gearing—and the upper set as well—operates under the most favorable conditions as regards lubrication; further, the end-thrust arising from it, and also that from the clutch during the periods when it is disengaged, is taken by the wide flanges of the main bearing shells.

Provision for End Thrust on Camshaft

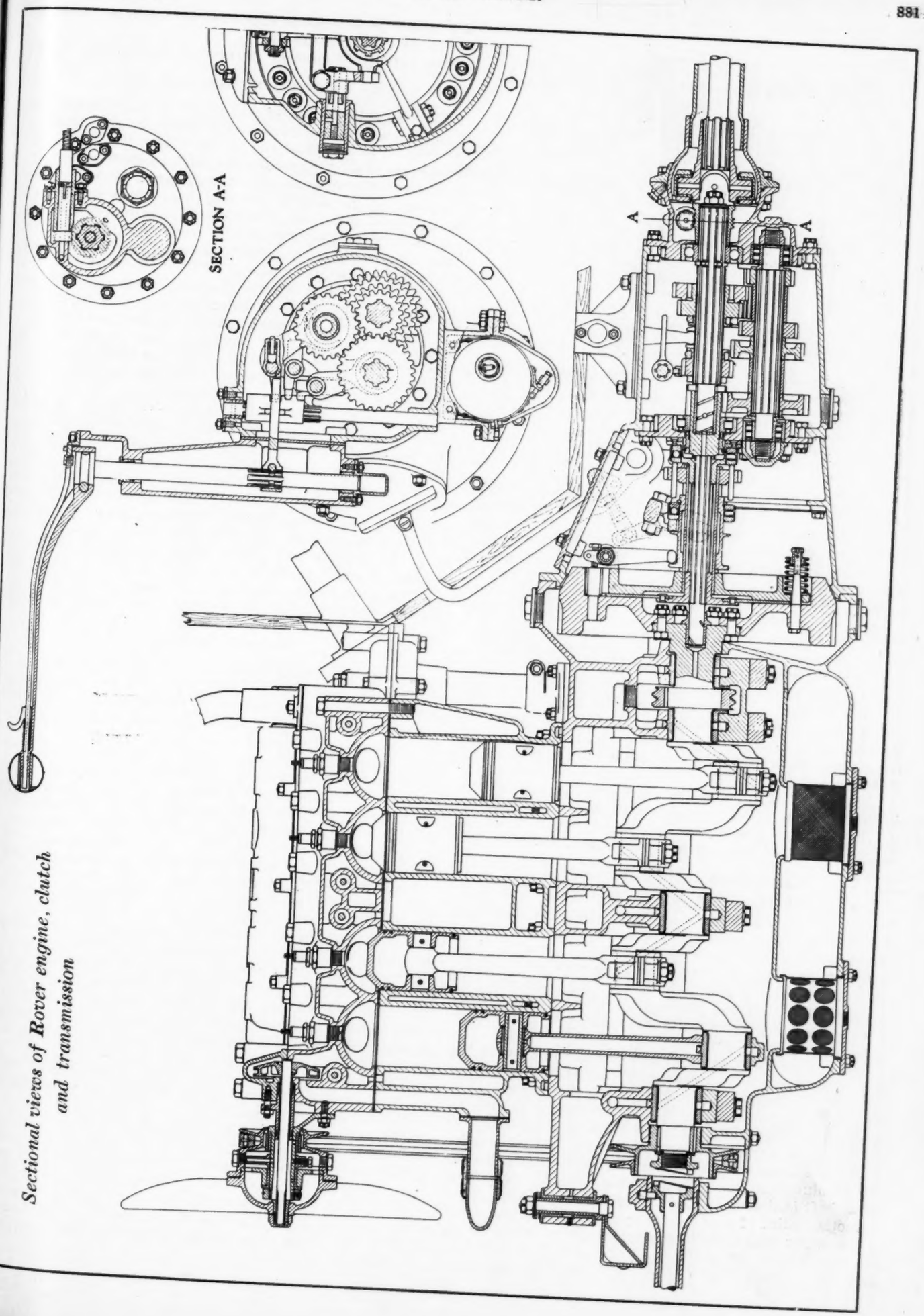
Special provision is made for taking the end-thrust on the camshaft arising from the upper set of worm gears. The latter are located in an oil pressure chamber supplied directly from the lower one through the vertical shaft casing.

The end-thrust is taken by the rearmost of four camshaft bearings integral with the cast-iron head; the rear side of the worm wheel bears against the flange of a combined nut and pinion which is bolted to the end of a long steel bolt passing through the hollow camshaft. This rod draws together two circular plates, which seal assembly holes for the camshaft in its trough. Screwing the combined nut and pinion farther onto the bolt presses its flange against the worm wheel, thus forming the second thrust block.

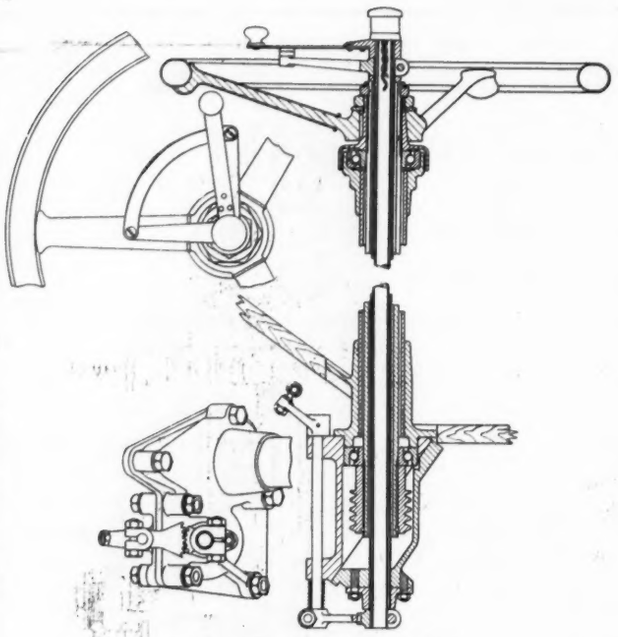
The purpose of the pinion is to provide an easy means of thrust adjustment to take up wear, without dependence upon a lock nut in the ordinary way. The pinion engages with two smaller ones mounted on the adjacent circular end plate, with spindles extending through the plate; the ends of these spindles are squared, threaded and provided with lock-nuts, and if, with the lock-nuts loosened, they are rotated the effect is to move the thrust block one way or the other on the long drawbolt, and to enable end-play of the worm to be eliminated. Means for taking up end play are provided also on the vertical shaft.

The fitting of the two-to-one worm gearing at the rear end of the camshaft removes the possibility—which exists where the reduction occurs at the lower end of the vertical shaft—of the latter being fitted or refitted at any time one complete revolution wrong. The couplings in the shaft have one odd-sized spline, also to prevent incorrect assembly from the standpoint of valve timing.

Below the crankshaft center line the vertical drive-shaft



Sectional views of Rover engine, clutch and transmission



Steering gear assembly views

is continued to the gear type oil-pump. The latter is submerged in the sump, which, with a flat base extending toward both sides, holds three gallons of oil. The crankchamber has a false bottom with two 3½-in. holes, forming communication with the sump; below these holes are filters attached to flange plates which, lying below the level of the sump bottom, form traps for sludge and water.

The pump delivers through its hollow driveshaft, first to the lower worm chamber and then, through the casing of the vertical driveshaft, to the upper worm chamber. From the latter it enters the hollow camshaft and also the rocker-shaft on that side, exuding at the various bearings into the trough. An exterior oil lead is taken from the upper worm chamber to the rocker shaft on the right; oil exuding from the bearings of that shaft falls into its trough and is maintained at the same level as on the far side by a cored hole through the cylinder head.

The level in both troughs is determined by a standpipe in the right-hand one, through which surplus oil runs by gravity into the housing of the steering gear, which is flanged and bolted to the underside of the cylinder head.

Crankshaft Drilled Diagonally

The crankshaft is drilled diagonally from each main journal to the crank pins, the oil entering the rearmost journal under pressure from the lower worm gear chamber, while the feed to the center and front journals is from cast-in ducts. Tubular steel connecting rods are used, up which the oil is delivered to the piston rings. From a hole in the top of the rod communicating with the central groove of the bushing, the oil, still under pressure, sprays against the head of the aluminum piston.

A constructional feature to be noted has to do with the studs which support the caps of the crankshaft main bearings. These bearings are carried by the upper half of the aluminum crankcase. Instead of being screwed into the aluminum of the crankcase, the studs are screwed into short lengths of round steel stock pressed into cored holes in the thickened webs above the bearings. Thus, threads cut in aluminum are not depended upon to resist the crankshaft load and that due to drawing up the nuts.

Another point of note relates to the mounting and drive of the water pump. Although seemingly mounted on an extension of the fan-shaft, the pump spindle is not subjected to any pull from the belt drive, the fan itself having a long plain bearing supported by a bracket independently of the pump casing.

The pump inlet passage is cored in the cylinder block.

Water Circulating System

The pump discharges into the cylinder head jacket and water reaches the cylinder jackets through large holes in the bottom of the head and in the top of the block, and circulation of water through the cylinder jackets is thermosyphonic. This arrangement, it need hardly be said, is intentional on the part of the designer, whose desire has been to level-up the temperatures of the cylinders and had respectively, by maintaining a more rapid circulation around hottest parts, viz., the valve ports, spark plugs and above the combustion space.

Reverting to the fan, the boss of this is enlarged to form an oil chamber in which deflectors cause the lubricant, thrown outward by centrifugal force, to feed into the long plain bushing. The driving belt is of the V link type and its tension is maintained automatically by a spring-backed loose front flange of the bottom pulley (not shown in the accompanying drawings.)

The three-point suspension of the power-plant is peculiar. The single point at the front is secured by a projecting bearer arm integral with the top half of the crankcase; this is bushed and held on the front cross member of the frame by a vertical bolt with a double-coil spring-washer which is not fully compressed. At the rear, each of two bearers extending from the flywheel casing is attached to the main frame by means of a pair of shackles or links lying in a horizontal plane, which arrangement, it is claimed, permits frame flexion in all directions to occur without stressing the aluminum crankcase, and positively prevents the powerplant from serving as a diagonal truss for the frame.

Magneto Ignition

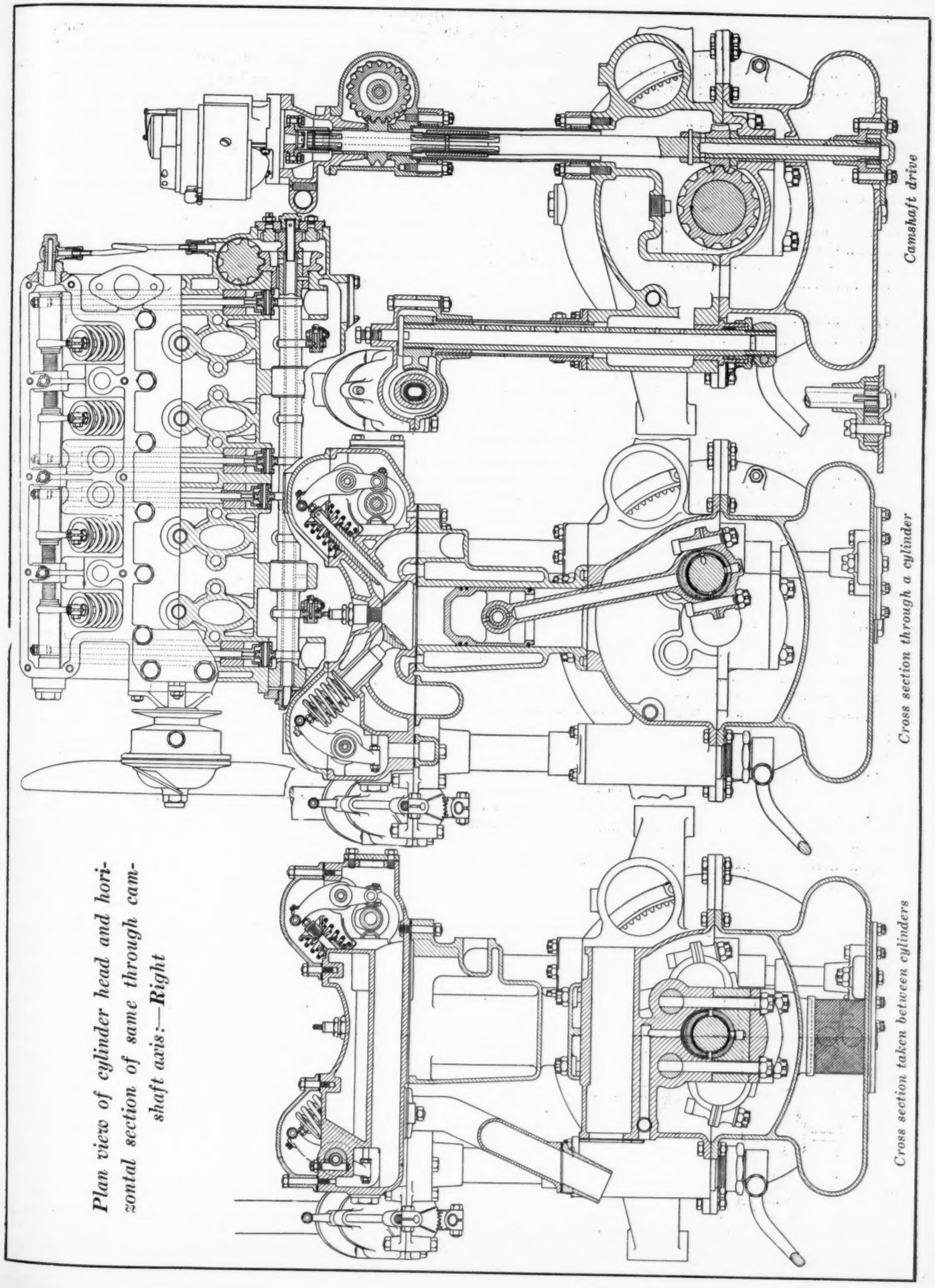
Ignition is by magneto, which is driven from the upper end of the vertical driveshaft, mounted on end, with a flange-fixing. Timing control is by the usual over-wheel lever, while throttle control is by pedal only, though a slow-running adjustment control is provided.

In connection with the induction system it is to be noted that the air intake is a gauze-covered opening in the crankcase, and across the mouth of the intake lies the exhaust pipe. The air inlet passage is rectangular (approximately 2 in. square) and is cored through the crankcase above the center bearing. For this feature it is claimed that the air is warmed and the oil cooled, and that the cooling effect extends to the journal bearing. The inlet tract is thus formed entirely within the cylinder block, with a central flange fixing for the carbureter.

The crankshaft is of unusually generous dimensions for an engine of this size, the journals and crank pins being of 1⅞ in. diameter, while the length of the bearings are as follows: Front, 1¾ in.; center, 2⅛ in.; each section of rear dual journal, 1½ in.; crankpin, 1¾ in. The liberal dimensioning of the crankshaft explains the omission of counterweights, which one would otherwise expect in an engine intended to run up to 4000 r.p.m.

The compression ratio is 5.5 to 1; at 2000 r.p.m. 34½ b.hp., is secured with an m.c.p. of 105, and a maximum output of 43 hp. is claimed.

The valve seats have a mean diameter of 1.712 in., with 1.5 in. ports. An exceptionally thick gage of wire (approximately 3/16 in. diameter) is used for the springs, the over all diameter of the latter being 1¾ in.; the valve stems are ⅜ in. diameter and the lift of the valves is 7.5 mm. End play of the rockers is prevented by helical springs encircling their shaft and abutting the bosses of the rockers.



Plan view of cylinder head and horizontal section of same through camshaft axis:—Right

Turning now to the steering, as already mentioned, the gear housing is secured by a flange fixing to the underside of the cylinder head, from the troughs of which the surplus oil runs into the gear casing. From the latter the oil percolates through the bearing of the vertical shaft of the worm wheel sector and back to the crankcase by way of the casing of that shaft and a cylindrical bracket or chamber cast on the side of the crankcase. This bracket forms a second support for the steering gear housing, and at its lower end is a second bearing for the vertical sector shaft, with a gland to prevent oil leakage. From the exterior extremity of the shaft the steering arm projects toward the right and takes effect upon a drag-link connected to the right-hand front wheel. At the upper end of the vertical shaft is a thrust block with an exterior adjusting screw and lock nut.

The drag-link joints are of the spherical type, with a spring-loaded coned plate to exclude dirt and water.

Flywheel Housing Integral

The flywheel housing is integral with the halves of the crankcase, while the bell-housing and gear casing are formed as a unit casting in aluminum, the rear portion being cylindrical.

The clutch, which is of the single-plate type, has metal-to-metal friction surfaces (bronze between steel) which are lubricated by oil from the engine and transmission. Fifteen springs are used, arranged in groups of five between the three driving bolts. The pilot bearing is plain and is lubricated by oil from the engine system.

The latter serves also for the lubrication of the clutch striking details and also for maintaining the oil level in the gearset and in the universal joint of the inclosed propeller shaft; this feature is secured by the crankshaft oil ducts being in communication with the drilled clutch shaft and primary drive shaft of the gearset. The latter has an elbow for initial filling and for level indication, but is independent of periodical hand replenishment; surplus lubricant returns to the clutch casing, is picked up by the flywheel and returned by way of a gallery to the crankcase.

Clutch Casing "Bulkhead"

At the middle of the clutch casing a "bulkhead" is formed to inclose a silent chain, which drives the generator from the clutch shaft, in a compartment where it has an oil-bath and where it can do no harm (to the clutch, for example) if it should break.

Four speeds are provided with right-hand control and an interior gate, the lever shaft being supported by an extension on the aluminum cover plate of the gear casing.

A feature of note is that the gear lever is made adjustable on its shaft, either to suit the idea of the individual owner, or to clear obstructions in special types of bodywork. In order that this feature may not upset the safety-catch for the reverse gear, the movement of the lever toward the extreme right (the reverse position) is checked normally by a trigger-bolt engaging with the semi-circular flange of a small bracket extending from the levershaft bracket; thus the check exists, no matter what the angle of the lever may be.

The shafts are supported by malleable steel end-plates, in which the journal bearings have their housings. This arrangement is said to permit indirect gears that are practically silent when cold to maintain that characteristic when hot. Moreover, in conjunction with special provision at the head of the torque tube, it enables all gears except the constant-mesh pair to be withdrawn without dismantling the bell-housing. Another advantage is the better support for the ball bearing afforded by the ferrous metal.

Constant Mesh Gears Used

Another feature of note is the use of constant-mesh gears which reduce the speed of the layshaft to approximately one-third of that of the mainshaft. The primary constant-mesh pinion has only 12 teeth, of special form providing a 22 degree pressure angle.

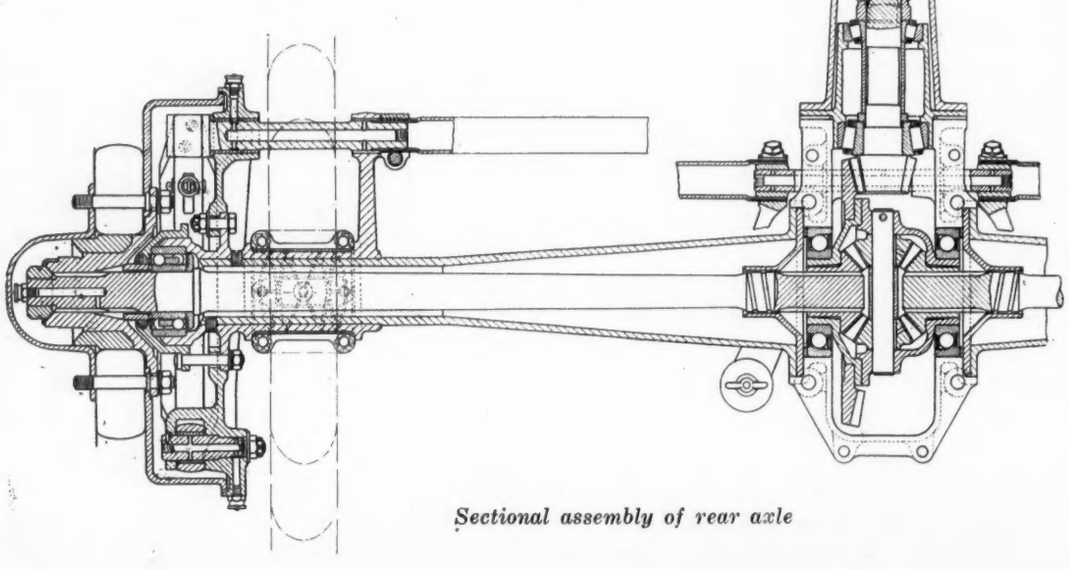
At the rear of the gearset is a star type universal joint inclosed in spherical casing with lubrication from the gearset. When the rear part of the casing is unscrewed and slid back on to the torque tube, the universal can be uncoupled, allowing the propeller shaft to be dropped to clear the way for the withdrawal of the gear shafts as mentioned above.

The torque tube is in two sections, flange-fixed together at approximately midway in its length; at this point is a steady bearing for the shaft.

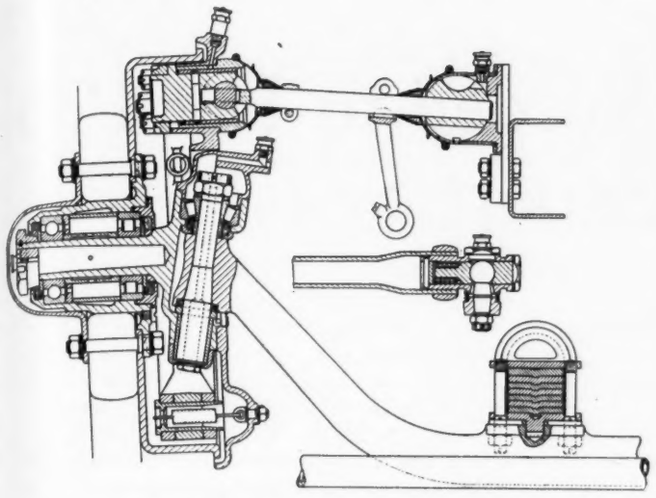
Spiral bevels form the final drive, with a bevel differential. There is nothing unorthodox hereabouts, though it is to be noted that combined radial and thrust ball-bearings are used on each side of the differential casing and a pair of taper roller bearings of rthe pinion shaft.

Half-elliptic springs are used throughout, those at the rear having white-metal lined spring blocks on the axle casing. All have two full-length leaves, the second one being curved almost completely around the first and finishing width having a pronounced taper.

The leaves of each spring are stepped down in thickness below the two upper ones and a deflection of 5 in. is allowed for in the case of the rear springs. Grease-gun lubrication is used, but instead of the spring shackle pins having mere channels connected with the central duct, they are slotted through from side to side, the slot being ⅛ in. wide and extending almost throughout the length of the



Sectional assembly of rear axle



Front axle with front wheel brake

bearing surfaces; by this means, it is claimed, the risk of blocking of the grease channels by impurities is eliminated.

Four Brake System

Turning now to the brake equipment, this is a four-brake system, implying only one set of expanding shoes within each drum. The front brakes are of the Perrot type and do not call for special remark. Shoes in all cases are of aluminum with fabric facings 2 in. wide, the drums being of 13 in. internal diameter and formed of pressed steel. The points of note concern brake application and they avoid the use of cross-shafts of unequal length and consequent unequal torsional stiffness. It is of interest to note that the need for consideration of this point in brake layouts was specified in an AUTOMOTIVE INDUSTRIES editorial as recently as July 24 last.

Attached to the central cross member of the frame is a casing containing three spur pinions, meshing with one another and having their shafts in the same horizontal plane. The central pinion shaft, extending to one side only, is partly rotated by either pedal and hand lever; the rear one carries a lever at each end, coupled to the front brakes, while the front pinion shaft, extending an inch or so on both sides of the casing, carries levers for pull-rods running back to the levers and brake shafts on the rear axle. The pull-rods to the front brakes are in two sections, the forward parts being outside the frame.

When the brakes are applied by pedal an over-running link allows the lever to remain stationary. This hand lever has a pull-up motion, the hand-grip being at right angles to a vertical shank. The latter, of rectangular section, has very coarse ratchet teeth cut on its front face. The vertical shank moves through a guide plate on the frame, which carries a large spring-loaded sliding pawl. Effort from the shank is conveyed through two horizontal levers under the frame. This construction eliminates the usual right-hand brake lever as an obstruction to the doorway, and allows a ratchet to be used of such size as will prevent the brake from slipping "off" when left applied.

From a British standpoint the chassis as a whole has a heavy appearance, which is largely accounted for by the unusually stiff frame; but the actual weight is quite moderate, being approximately 1900 lb. The side members of the frame are incurved at the front and have an extensive sweep over the rear axle. The stock used throughout is 10 gage steel (approximately ⅛ in. thick) and the frame sides are 5 in. deep between the spring brackets. With one exception all cross members are of pressed steel. Where the engine bearer arms are secured, one web of the channel is stiffened by small pressed-steel angle brackets, riveted within the channel.

Solid Forged Front Axle

The front axle is a solid forging of round section throughout, straight between the spring but with a big sweep up to the pivot axle. The fuel tank of rectangular section, is arranged alongside the torque tube on the left, vacuum feed being utilized.

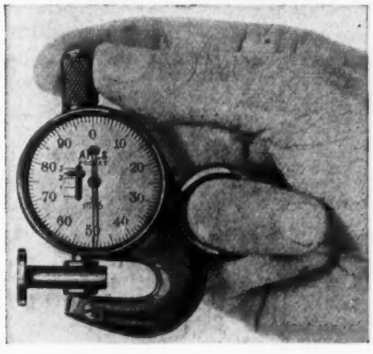
The following dimensions, etc., apply: Wheelbase 120 in.; track, 54 in.; minimum ground clearance, 8 in. The oil sump has a capacity of three Imp. gallons. Fuel consumption is at the rate of 1 U. S. gal. per 21-25 miles. The gear ratios are: Top 4.75; third, 8.9; second, 13.1, first and reverse, 19.2. Dunlop balloon tires are standard, 32 x 5.25 in., on hollow steel wheels.

The designer of this chassis is P. A. Poppe, who, as a member of the firm of White & Poppe prior to and during the war was responsible for W. & P. engines and carbureters; he was also the designer of the original Morris car and controlled one of the largest airplane plants in England when his factory was taken over by the British Government during the war.

Although offhand the design would appear to be costly to manufacture, Mr. Poppe claims to have studied the production aspect as carefully as that of performance, and in this connection one point may be noted, i.e., that in respect of dimensions, apart from those on the metric basis, all under ⅝ in. are in steps of 1/16 in., and all over in steps of ⅛ in.; there are no "thirty-seconds" or "sixty-fourths" in the design.

The five passenger phaeton sells for £550, the Weyman sedan for £660.

New Pocket Dial Gage



THE Ames pocket thickness gage has been added to the line of the B. C. Ames Co., Waltham, Mass. It is a compact little thickness indicator, reading in thousandths of an inch, which fits easily into the vest pocket.

The dial face is only 1½ in. in diameter, and the net weight is five ounces. The frame is of solid bronze and comparatively rigid, and it is finished in bright nickel. The large pointer records thousandths of an inch on the dial and the small pointer records the number of revolutions made by the large pointer. The pocket gage has a capacity of 5/16 in. and will measure flat, round, hard and soft materials up to that size. Accuracy to 0.0005 in. is guaranteed by the makers.

UNDER the new Italian traffic law the width of motor vehicles is restricted to 86.6 in.; the height to 157.5 in. and the length to 236.2 in. Not more than five tons can be carried on a single axle nor more than eight tons on two axles.

Automotive Industries
November 20, 1924

Better Methods Are Needed to Put Pep in Accessory Export Sales

By P. F. Baillet

THERE are three chief phases to be considered when introducing a motor car accessory for sale in foreign markets.

First, we must consider the potentiality of the various markets. There is no great need to get excited and waste valuable time and money in certain West Indian Islands, most of the Central American countries and some of the smaller South American markets. These may be well left until later, when the car registration justifies the effort. A list which has helped me considerably in selecting those markets with the larger car registrations is one published by the Bureau of Foreign and Domestic Commerce and another by the Class Journal Co. These give separately the number of passenger cars, trucks and motorcycles and tell at a glance where you should concentrate your efforts.

Second, we must ask the questions: "Is it in itself suitable for these markets? Is the price right and what is the competition existing there?" In some countries such as China, Japan and others, you find they want plenty of bright polished nickel finish, while in Europe and other markets they are not so keen about this brightness so long as the article is substantially finished.

You can talk quality until you're red in the face and perhaps you will make some sales on that basis, but, believe me, price is the main factor that will sell your goods abroad today. Of course, you have got to have good quality along with low prices if you want the repeat business.

We must keep our ears and eyes open and our mouths closed about our competitors.

Third, the method of sales and distribution must be determined. Will we have a merchant jobber or importer buying and stocking on their own account with sole selling rights, or will we keep the market open to all dealers, jobbers and importers who wish to buy our line direct from the factory, or will we do the latter and have a resident sales representative call on these dealers, jobbers and importers to solicit their business and book the orders?

The type of product and the territory to be worked should have a considerable bearing on this decision. My experience indicates that in selling a horn, lamp, mirror, etc., produced in only a half dozen sizes and types or shapes, any of which can be fitted to any car or truck in most territories better results can be obtained by selling this type of product to all the jobbers and importers and even to the dealers if you have a sliding scale of discounts that will protect the wholesalers who order in large quantities.

In this case it is well to use the services of a resident sales representative who will comb the trade constantly giving the customers suggestions and sales assistance and seeing that their stocks in your particular line are kept up and booking orders for their further requirements. As your representative this type of salesman receives from 5 to 10 per cent commission on all direct and indirect business shipped into his territory. I have this method working out wonderfully well in the Argentine, Uruguay, Brazil, Colombia, Venezuela, Cuba, Porto Rico, Australia, New Zealand and the Far East.

In Europe, however, I have not found it to work out so well. The sole distributor with his highly organized sales organization seems to give the best results. The trade there prefers to buy from local stock, delivered with all incidental expenses paid by the distributor. They prefer to let him worry about the manufacturers' f.o.b. delivery price, shipping charges, insurance, consular fees and exchange. In other words, they want to know their cost in pesetas, francs, lira or crowns delivered to their shop or warehouse while our neighbors to the South of us prefer to speculate on shipping and custom charges, and particularly in the exchange. In selling bumpers, radiator caps, brake lining and piston rings, etc., the sizes, styles, shapes and other specifications run into many numbers. To supply the demand successfully it requires the jobbers or importers to carry quite a large stock of sizes to fit the various makes of cars in their territory. With this class of accessories I have found it better to confine distribution to one distributor.

IN selling automobile accessories to foreign markets, says P. F. Baillet, remember that:

1. **You can't sell accessories where there aren't any cars. Concentrate on markets where registration justifies effort.**
2. **Price is an important factor in foreign sales and goods must be suited to the market. The Far East likes lots of nickel and brass, while Europe isn't so keen for brightness.**
3. **You probably can sell successfully through all jobbers and dealers such items as horns and lamps which can be fitted to any car or truck, but the best way to sell such things as bumpers probably is to give specific territories to certain jobbers or importers.**
4. **That it is profitable to know about your competitors but not to speak ill of them.**

All export men will not agree with these conclusions, but they should stimulate thought on the problems mentioned since they have been formed by a man with ten years' experience in the field. This is a digest of a talk given recently before the Overseas Club.

Buying on Purely Price Basis Often Proves Expensive in the Long Run

Such purchasing tends to produce unstable sources of supply which in turn tends to increase cost of material. Long-swing trend is of a far greater importance than short-swing necessity.

By Harry Tipper

TWO main factors that govern buying and selling: long-swing trend and short-swing necessity.

And in the life of a permanent business, the long-swing is of a far greater importance than the short-swing. Why?

Because too close attention to the short swing leads to over-buying at low points in the market and insufficient buying at the high points. The effect is to reduce the stability of the sources of supply, introduce more destructive price competition among the suppliers and to interfere with permanent development of the quality, uniformity and distribution of the products required.

In the operations of the individual piece of work, the short-swing is frequently of more importance than the long-swing. It should be the purpose of organization development to establish the operating policy on the most efficient basis for the long-swing, and then operate the individual piece of work so that advantage is taken of the short-swing fluctuations to the fullest extent that the long-swing policy will permit. The erection of a new factory, the extension of factory buildings, investment in equipment, for instance, should be based upon an examination of the potential business over a period of several years.

During the era of expansion, virtually ended—in the automobile business—the policy was almost entirely a short-swing one. The business would not have grown so thoroughly in any other way. No man in 1910 could have visioned the growth of business which actually occurred before 1915.

In 1915 a man who permitted himself to prognosticate as great an expansion as occurred between 1915 and 1920 would have been classed with gold brick artists or dubbed a fool. Therefore, the business was operated on the short-swing, and tomorrow was far enough to look ahead.

Mistakes were made; were lost sight of in success due to the rapid change of expansion. But the methods which were found to be successful in the era of expansion are not necessarily those which will be successful in the immediate future of the automobile business.

The growth of the business demanded quick turnover, immediate operation, increasing quantities and many additional sources of supply. With business facing slow expansion, fortified with ample sources of supply and the problem of making present plant capacity pay a profit, can the same methods succeed?

We are now entering a period when fluctuations will have a more important effect on profit and loss than will the expansion, an entirely opposite condition from that which has prevailed. During the last twenty years the fluctuations have been unimportant, the rate of expansion the only vital factor.

Essential Values

When business is to be done on the fluctuating basis, the problem becomes one of reducing the area of fluctuations by retaining as much flexibility as possible. Then low points in the fluctuations will not be too costly, and the development of a system by which stability of flow in materials and stability of sources in supply can be depended on will show the true value of the long-swing trend.

Every historical period of destructive competition has been associated with price. Wherever price has been permitted to control the buying without a consideration of the value factors, the struggle for business has induced manufacturers to take business on a price basis to their own final destruction.

There can be no doubt that buying on price only is very destructive to the supplying industry. The fact that it is costly to the buyer is not usually taken into account so severely.

Price operations arise from the fact that at no time is the organization of industry thoroughly balanced. There is always a tendency for buying to vary in its activity—for protection to vary similarly.

Wherever the buying and selling is done in a price basis purely, price operations are exaggerated and the fluctuations in volume are more violent. Wherever other values are taken into consideration together with price, the fluctuations in price and volume tend to become less violent; the business stabilizers and the sources of supply have a tendency to become permanent.

When the business of producing automobiles, trucks and their component parts went upon the basis where the rate of expansion was of less importance than the ex-

EVERY historical period of destructive competition has been associated with price.

Wherever price has been permitted to control the buying without a consideration of the value factors, the struggle for business has induced manufacturers to take business on a price basis to their own final destruction.

This is the ninth in a series on "Profits vs. Volume." The tenth, which will appear next week, deals with the purchase of machine tool equipment.

tent of flexibility, the amount of profit began to depend more largely upon the stability and flexibility of the manufacturing organization and processes.

Part of this stability and flexibility comes from the regularity in the buying of supplies and materials. Apart from the establishment, or continuance of stable sources of supply, a further part from the character of the relations they established between the supplier and the manufacturing customer.

The efficiency of this kind of operation demands a consideration of buying values, in addition to price. Up to the present these additional values have not been given sufficient consideration. It is necessary for the manufacturing establishment in the automobile field to estimate its costs on the basis of an average price condition in its supplies and materials for the sales period, because the product—car or truck—is commonly sold at the same price during the sales period.

Buying on price only tends to exaggerate price variations, tends to increase the difficulties of the suppliers, and seriously affects production operations by making it more difficult to maintain an agreement between average estimated cost and actual cost.

For two years after 1920, concerns in the automobile business were attempting to use in the automobile materials which had been bought at high prices in the boom. They had to be used in manufacturing when the prices of cars and trucks were far below the maximum.

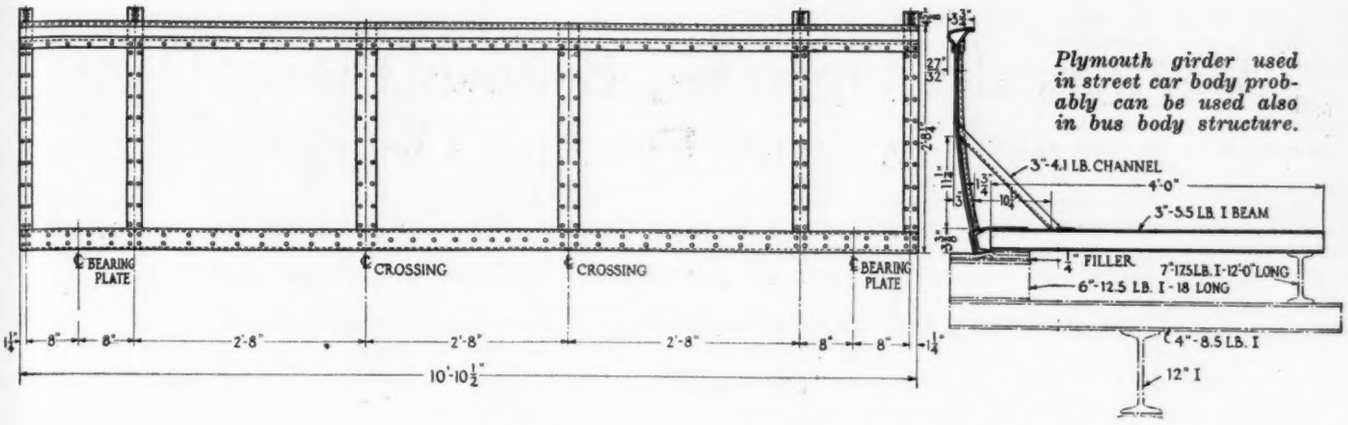
Price has its very definite place in the consideration of buying, whether of supplies or materials. It is more important in buying raw materials because the fluctuations in the raw material prices are more frequent.

Where the market is public, prices are known and established between the buyer and seller with considerable frequency. Steel, copper, aluminum, etc., must be bought only after a careful consideration of the markets and their tendency to rise or fall. The purchase of fabricated supplies should not be conducted on the basis of price as a principal value.

Wherever the processes of fabrication enter into the making of the article to be bought, the price must depend on average conditions of cost in production in a determination of the price which must be paid. The attempt to put these upon a price basis tends to destroy the stability of a fabricating organization, to reduce the general average of quality per dollar, and to react upon the buyer by reducing the sources of supply.

Ford Airport Constructed in the Interests of Commercial Aviation

THE recently completed "Ford Airport" at Dearborn, less than nine miles from the center of Detroit, which Henry and Edsel Ford have built in the interests of commercial aviation. Runways are 300 ft. wide, 3400 and 3700 ft. long respectively, and entirely free from obstacles. The name Ford is visible from an altitude of 10,000 feet. The field is drained to provide year-round, all-weather operation and is to be used for manufacturing, testing and operating commercial airplanes and dirigibles. The Stout Airplane Co. already has a plant on one side of the field. Visiting pilots are permitted to land and stay for twenty-four hours. Ford Motor Co. has no intention of going into the airplane business other than to watch its development, according to a statement which Mr. Ford recently issued.



Plymouth girder used in street car body probably can be used also in bus body structure.

Plymetl Girder Used in Construction of New Street Car Body

Tests indicate that unit may be adopted successfully to bus design and thus aid in reducing weight. Case School and Northwestern University make tests.

AN exceptionally light weight girder made largely from plywood and sheet metal is being used in street car body construction and gives promise of ready adaptation in similar bodies for buses. The web of the girder is of Plymetl, a product of the Haskelite Mfg. Co. of Chicago.

Plymetl consists of a core of laminated wood with galvanized steel faces cemented to it. In the past this material has been used extensively for sheathing over a structural steel frame, and while this results in a body of great strength and some other good qualities, the plymetl is not used to the best advantage. The reason that it has been possible to build all steel cars which are lighter than wooden cars of the same capacity is that the steel sheathing is used to help support the load by the construction of flat girder sides. Similar construction principles evidently may be applied to plymetl, and in order to determine the possibilities of such girder sides the C. C. Kuhlman Car Co. constructed girders of plymetl which were subjected to strength tests at Case School of Applied Science and at Northwestern University.

The girder tested at Case School was made of three ply wood 5/16 in. thick, covered with metal faces of No. 27 gage galvanized steel. The girder was of the form shown by the accompanying drawing, having a total length of 10 ft. 10½ in. and a depth of 2 ft. 8¼ in., and duplicating as nearly as possible a section of the side of a street car. It was reinforced with small shapes and strips of steel riveted to it. The rivets are inserted while hot. It might be expected that they would burn the laminated wood and thus give a poor joint, but it is stated that owing to the absence of air no actual combustion takes place. The surface of the plywood at the rivets is slightly charred, which, however, does not prevent a good substantial joint.

In the tests conducted at Case School of Applied Science, the girder was supported on bearings at both ends and the load was applied through cross beams supported on the girder.

It has been found that the composite material can be securely fastened to the steel frame work by hot riveting. A 5/16 in. rivet will support a load of more than 2000 lb. before failure, and a ⅜ in. rivet more than 3000 lb. In making the tests for strength of the riveted joints, batten strips were applied to the face of the material, as is customary when plymetl is applied to the steel frames of cars. Tests were made on both double and single strap joints. With the double strap construction the rivets were in double shear and the joints failed when the material of the panel gave way as a result of the bearing pressure of the panel. The pull in each case was applied in the plane of the panel. Following are the results obtained in the two series of tests on double strap construction:

Case School		Northwestern University Laboratory	
	5/16-In. Rivet,		3/8-In. Rivet,
No.	Lb.	No.	Lb.
1	2,325	1	3,300
2	2,900	2	3,000
3	2,880	3	2,700
		4	3,800

Tests made on joints having only one cover strap ⅛ in. thick and using ⅜-in. rivets driven hot gave the following results:

SHEAR TESTS ON RIVETED PLYMETL

5/16-In. Plymetl, 3/8-In. Rivets in Single Shear

	Maximum Load,		Maximum Load,
No.	Lb.	No.	Lb.
1	2,500	3	2,530
2	2,960	4	2,870

Calculations show that a plymetl girder is much stiffer than a steel girder of the same weight. In fact, the plymetl 5/32 in. girder weighs less than a 1/16 in. steel girder, while the product EI (modulus or elasticity times movement of inertia), which is a criterion of the stiffness, is forty times as great.

There is a considerable demand for lighter bodies for motor buses at the present time, and it may be that the plymetl girder as described above will help in solving the problem arising from this demand. Bodies of this type might even make it possible to use lighter chassis frames, for the preent heavy frames are needed chiefly to make up for the lack of rigidity of the body.

Magnetically Operated Bellows Pump Used as New Fuel Feeding Device

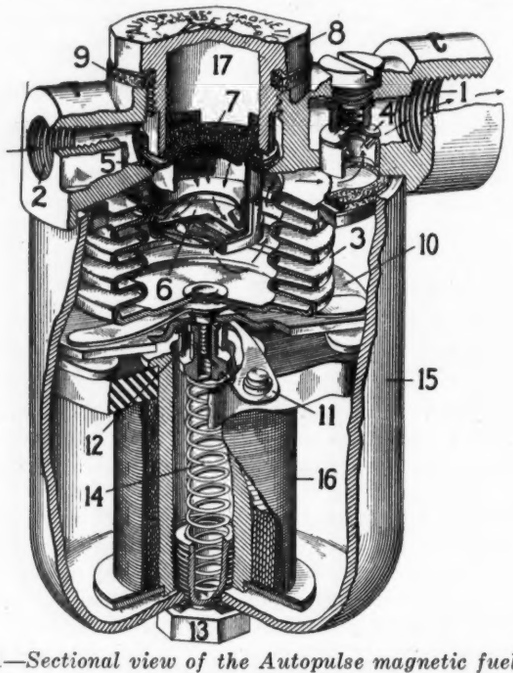
"Autopulse" operates off storage battery on same principle as electric bell. Is mounted directly on carbureter and is said to maintain full supply regardless of grade or temperature.

By Donald Blanchard

AN electrically operated gasoline feed device, known as the Autopulse magnetic fuel pump, has been brought out by the Ireland & Matthews Mfg. Co., Detroit. Gasoline is drawn from the supply line and delivered to the carbureter by the pumping action of a brass bellows which is expanded by an electromagnet energized from the battery. This action also compresses a helical spring which supplies the energy necessary to compress the bellows, thus delivering the fuel drawn into it during expansion. The output of the pump is controlled by the carbureter float valve. The rated capacity of the pump is eight gallons per hour, but it has a maximum capacity of about 12 gal. per hour. The pump is built in one size only, but may be had wound for operation upon either six or twelve volts. If additional pumping capacity is required, two or more units are connected in parallel.

Referring to Fig. 1, the winding on the electromagnet 16 is connected to the ignition switch and, consequently, current flows through it as soon as the switch is closed. The armature 10 has a three point mounting consisting of three hardened steel balls, two below and one above, and is free to move up and down like a hinge. The center of the base of the bellows 3 is attached to the armature.

The pull exerted on the armature by the electromagnet causes it to move downward, thus expanding the bellows. This motion also compresses the helical spring 14. A pair of tungsten contacts are included in the electrical circuit. One of these can be seen at 11 and the other in Fig. 2. The former contact is mounted on a flat phosphor bronze spring, attached to which is the steel sleeve 12. This sleeve projects part way into the electromagnet and is concentric with its axis. When the current flows, the magnetic action on the sleeve is such that it moves upward toward the armature, thus stressing spring 11 and increasing the pressure on the contacts. This occurs during the downward stroke of the armature. It prolongs the contact time and the release of the spring gives a more rapid break after the downward motion of the armature opens the circuit by separating the contacts. The cycle is completed by the upward motion of the armature caused by spring 14 and the closure of the contacts. The stroke length is controlled by the action and set of spring 11.



1—*Sectional view of the Autopulse magnetic fuel pump, actual size*

Expansion Bellows Draw In Gas

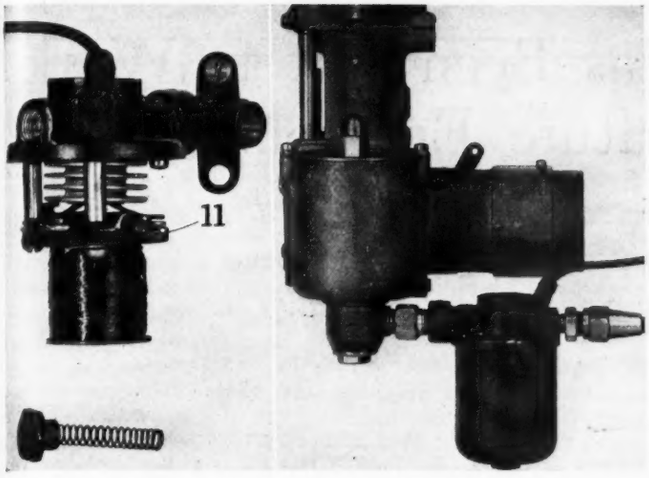
Gasoline is drawn into the pump by the expansion of the bellows. It enters at 2 and passes through slots in the wall of cap 8 under chamber 17. It then passes through screen 7 and enters the bellows through the spring controlled monel metal valve 6. Discharge is through automatic valve 4 and outlet 1.

The output of the pump depends on the rate at which gasoline is withdrawn from the carbureter float chamber —in other words, the rate of fuel consumption. The force exerted by spring 14 is not sufficient to compress the bellows and force gasoline into the float chamber when it is full. However, as soon as sufficient fuel is withdrawn to open the needle valve, spring 14 compresses the bellows, thus discharging the fuel and closing the contacts. The pump then takes a suction stroke and pumping continues at greater or less capacity, depending upon the needle valve opening. It is evident, therefore, that the Autopulse delivers gasoline to the carbureter only as needed and that, when it is not pumping, no current is withdrawn from the battery.

When pumping gasoline the stroke of the armature is from 02.5 to 0.030 in. and the maximum speed is from 800 to 1000 strokes per minute. About 5000 strokes are required to deliver a gallon of fuel. Assuming that the engine of the average car consumes gasoline at the rate of 1.5 gallons per hour, the pump would operate at an average speed of about 185 strokes per minute.

When pumping air, the length of the stroke is increased and the speed may go as high as 2500 strokes per minute. In the event that electrical connection is not made at the end of the normal stroke, the armature will continue its upward motion for a considerable distance until electrical contact is made. When the pump is installed below the carbureter and consequently must work against a head of gasoline, the amount of this travel is reduced and the factor of safety provided by the "set-up" pressure on the contacts is decreased.

Arcing at the contacts is avoided by the use of a short-



2—Autopulse with its housing removed. The spring and nut shown is No. 14 in Fig. 1
3—Autopulse installed on a carbureter

circuited secondary winding on the electromagnet. When the contacts open, the energy that would otherwise manifest itself in the form of a spark is absorbed by the current induced in the secondary winding. This design is said to give the same results as a condenser and at the same time to be more compact and less expensive to manufacture.

The recommended installation is shown in Fig. 3. On the inlet side the pump is threaded for a ⅛ in. pipe and on the outlet side for a ¼ in. pipe. When used with a two wire electrical system, the pump must be insulated from both the carbureter and the fuel supply line. This is easily accomplished with rubber tubing.

The current drawn by the Autopulse while making a stroke is said to be in the neighborhood of one ampere. However, owing to the intermittent demand, the average current or meter reading is stated to be from ¼ to ½ amperes, when pumping at rated capacity. On a 6-volt battery the current consumption is given as 50 amp. hrs. per 1000 gal. delivered.

The life of the device is measured by the number of gallons pumped, and laboratory tests indicate that it is capable of delivering from 10,000 to 20,000 gal. Few cars use more than 1000 gal. a year, so the life of the unit is greater than that of the car. Wear of contacts and bearings causes a reduction in pressure and capacity, but this is said not to exceed 10 per cent for 6000 gal.

Among the advantages claimed for the device are that it attains full gasoline pressure at the carbureter before the engine is cranked and that it maintains a satisfactory supply regardless of grade, altitude or temperature. It is self-priming and only a very small amount of gasoline is carried in proximity to the carbureter. The ignition switch controls the supply of gasoline and, in case of fire, the supply consequently can be shut off immediately. A break or loose connection in the supply line will not cause a loss of fuel, as the pressure within the pipe is subatmospheric and air will leak in. In case of an air leak, the change in the pump operation will give an audible warning. A partial or complete stoppage of the fuel line is indicated by excessive fluctuations of the ammeter needle. It is claimed that this device cannot flood the engine, as fuel can enter only in the normal manner through the carbureter. No lubrication or adjustment is necessary during the life of the average car. The mechanism is practically sealed in a metal housing and, in the event of a leak in the bellows, fire is not likely to result, because of an insufficient supply of oxygen to support combustion.

World's Production of Rubber Standing Still in Face of Increased Consumption

WORLD'S consumption of rubber will exceed world's production in 1928 according to an analysis and forecast by Ray B. Prescott, which the Rubber Association of America, Inc., published.

World production is based on a study made by David M. Figart, special agent of the Department of Commerce; while future production can be determined by acknowledge of the rubber trees already planted, since they must be five or six years old before they begin to produce latex of a quantity and quality sufficient to warrant considering them as a source of supply.

Potential production from acreage as it exists today and which will probably not reach the figures given is stated in thousands of tons.

Year	World's Production	World's Consumption
1924	531	500
1925	574	530
1926	606	580
1927	623	610
1928	633	640
1929	637	660
1930	641	700

This does not mean that there will be an actual shortage of rubber for world's surplus at the end of 1923 was estimated at 270,000 tons. But it does mean that it will probably be necessary to use a part of this surplus.

In his analysis Mr. Prescott points out that with the price of rubber where it is and the years required to make a plantation profitable there is little reason to believe that more rubber trees will be planted in the immediate future.

Seventy-two per cent of the rubber used in the world in 1923 was consumed by the United States. Eighty-three per cent of the U. S. total was consumed by the automotive industries. Assuming that the ratio of consumption should continue at its present rate, 72 per cent, there will be a considerable increase in consumption over production in 1930. Should European conditions improve as is anticipated consumption there would still further increase the shortage.

The amount of rubber used for tubes, casings, solid tires, foot wear, mechanical goods and miscellaneous is shown in figures and in graphs together with tables, charts, explanations, conclusions and probable variations in Mr. Prescott's survey. The booklet is obtainable from the Rubber Association of America, Inc., 250 West Fifty-seventh Street, New York City.

CHROMIUM silicon alloy steel valves are now being used in the Fordson tractor engine. The new valves are said to be better able to withstand high temperatures developed in a heavy duty engine. It is also claimed that they will not warp and that oxidation or scaling is minimized, thus preventing pitting or beaking off of valve heads. The new valves are heat treated, hardened and ground. This minimizes wear at the end of the stem coming in contact with the tappet, and between the valve stem and guide bushing. The valve spring is held in position by a steel seat and split collar. Due to the hardness of the new valve alloy, it is said that regrinding will be necessary less frequently.

How Electric Heat Has Been Put to Work in Low Temperature Enameling

Explosions possible with restricted ventilation, regardless of temperature, tests show, can be prevented by keeping mixture lean. Proper equipment described.

By Wirt B. Scott*

Manager, Industrial Heating Section, Westinghouse Electric & Manufacturing Co.

THE development of the electrically heated enameling oven within the past seven years is due to a concentration of effort on the part of electrical manufacturers and central stations upon a single industry—the automotive; and was accelerated by a willingness on the part of that industry to cooperate.

Previous to this development, the ovens were heated with gas, the burners being usually placed directly in the oven, and the heating being accomplished by the heated air of combustion bathing the work en route to the ventilation ducts placed in the roof of the oven. The ovens were poorly constructed, practically no attention being paid to thermal insulation, due to the low price of fuel. The art of enameling was extremely crude, the enameling departments being at the mercy of men who professed to possess so-called "trade secrets," the majority of whom knew little about the technique of enameling and were at a loss to account for the large percentage of rejects that frequently occurred.

The first experiments made to electrify enameling ovens consisted in placing makeshift electric heating units in old gas ovens. Practically nothing was known as to the chemical action resulting from the baking of enamels, hence the first effort was to duplicate the results then being obtained with gas. Enamels of the kind under consideration consist of an asphaltic compound carried in a suitable solvent with enough oil to make it resilient after baking. It was known that the solvent was driven off and that the oils underwent oxidation, but practically nothing was known as to the ventilation problem involved. In burning the gas directly within the oven, an excessive amount of air was necessarily and fortunately introduced, automatically and unintentionally taking care of a condition that was not generally known to exist.

Advantages of Electric Heating

The first experiments using electric heat disclosed three points of advantage, namely, elimination of fires due to a combustible fuel, reduction in time required for baking, and a baked product having a smoother surface. Tests subsequently made by the research department of the Detroit Edison Co. revealed the fact that the baking in an electrically heated oven was accomplished largely by radiant heat, which seemed to penetrate the enamel quicker and to a greater depth than when heated by convection currents as in the direct gas ovens. The lack of products of combustion within the oven accounted for a cleaner product.

It is found, however, that the cost of operation was excessive as compared to gas and, knowing that a large amount of heat was being carried off in the vent ducts, it was thought that this source of loss could be eliminated, since no air was required for combustion. The first experiment consisted in closing up the oven as tightly as possible and attempting to bake, but it was discovered that the enamel would not bake, regardless of the length of time that the work was in the oven, but remained in a "tacky" condition. This brought out the fact that a certain amount of air was required for oxidizing the enamel.

Composition of Enamel

A continuation of these tests to determine the proper amount of air for oxidizing purposes resulted in a violent explosion of the oven, which almost completely demolished it. This forcefully brought attention to the composition of the enamel, which was found to consist of approximately 50 per cent naphtha as a solvent for the asphaltum, which was distilled off as a gas. Most of the heating elements used at that time were operating at a temperature of approximately 900 deg. F., hence it was thought that if heaters were designed to operate at a sufficiently low temperature the ignition of the naphtha vapors could be eliminated and a restricted amount of ventilation be used.

A small test oven was constructed, electrically heated, with positive means for controlling the air entering, and the gases leaving the oven. Samples of many kinds of enamel were obtained and subjected to the same tests. These experiments consisted in placing a small vessel containing enamel within the oven, and with the inlet and discharge ducts closed, raising the oven to a high temperature, cutting off the heaters to insure a stabilized uniform temperature, then opening the inlet and next the exhaust duct. Within a few seconds after opening the vent ducts, an explosion would occur. Similar experiments were made at reduced temperatures, with explosions in each case. Explosions were readily obtained at a temperature of 550 deg. F., and in several cases, at the baking temperature of the enamel itself, demonstrating the impracticability of attempting to operate with a heating element of sufficiently low temperature to eliminate the possibility of explosions when restricting the ventilation.

During these tests, it was noted that after each explosion the flames appeared to burn from the floor. It was first thought that this was the result of the enamel being blown out of the container, but more thorough investigation disclosed that the flame was due to the ignition of the volatile gases, which appeared to settle on the floor. Tests were then made to determine definitely the action of the volatile gases within the oven, and it was found that they were heavier than air and would first descend to the floor, filling up the oven like so much water. The gases were driven off very rapidly upon heating, consequently, before the baking temperature was reached,

*Presented at Meeting of American Electrochemical Society.

the mixture within the oven would be too rich to explode. Upon releasing some of the gas and admitting fresh air, the proper explosive mixture would be obtained. Under normal conditions of ventilation, the gases, after descending to the floor, would become heated, and ascend to the roof, passing out through the vent duct.

Conclusions from Tests

As a result of these tests, the following facts were established:

1. With restricted ventilation, explosions were possible in enameling ovens, regardless of the temperature of the heating element.
2. A sufficient amount of air must be admitted to the oven to keep the mixture "lean," or sufficiently dilute to make an explosion impossible.
3. The vapors should be withdrawn at or as near the floor as possible.

The first oven to be put in operation using the floor method of ventilation was also equipped with the roof method of ventilation in case the former failed, or if it was found necessary to use a combination of both. Air was admitted back of the heaters. Tests not only showed that it was possible to ventilate from the floor, but that it was the proper way of ventilating when volatile gases must be removed. Repeated tests showed that one-third less air could be used when ventilating from the floor, and that the length of time required for baking was reduced 25 per cent.

The reduction in the time required for baking was not an unlooked for advantage. Heaters, as well as gas burners, were restricted as to location within the oven. The work, after being dipped or sprayed with enamel, is allowed to drip or "set" before entering the oven. Upon heating, the enamel softens, and a certain amount flows off, dripping on the floor. Heaters placed on the floor under the work would soon be covered with enamel, the coking of which would ultimately cause a fire, even if the enamel did not ignite immediately when coming in contact with the heating element. For this reason it was found advisable to place the heaters along the side walls, but as near the floor as possible. With heaters placed in this position, and ventilating at the roof, the direct path for the heated air was up the side walls, across the roof, and out. This left a large space in the middle of the oven difficult to heat, the work necessarily remaining in the oven until that space was heated. In order to heat the coldest portion of the oven up to the desired temperature, the other parts had to be considerably overheated, which was not evident since the thermometer bulb was placed in the door, the coolest part of the oven. Ventilating from the floor, the heated air passed up along the side walls across the roof, and down through the middle of the oven, and out, producing a much more uniform distribution of temperature by bringing the hot air through the middle of the oven and down to the cold floor.

Heat Insulation of Ovens

Simultaneous with these tests, oven builders were being interested in designing and building better insulated ovens, and it was soon demonstrated that an oven having 4 in. of high grade insulation was a paying investment over one having 1.5 in. of poor insulation, which was then standard practice.

Furthermore, attention was called to the enormous amount of through metal in the form of bolts and channel iron extending from the inside to the outside of the oven, which in many cases accounted for 50 per cent of the entire radiation less. This, in course of time has been reduced to a large extent, consistent with good mechanical construction.

Electrical manufacturers began to appreciate the difficulties encountered in oven work, and to design heating elements specially adapted to ovens. Approximately 95 per cent of all electrical troubles occurred in the terminals or connectors. Copper wires were first used to connect the heaters, the method for making the connections being left largely to the skill and imagination of the electrician doing the work. Bus bars were substituted for wire, aluminum bus bars for copper, and finally cold rolled steel bus bars were adopted, which has now become standard practice.

In adopting the cold rolled steel bus bar construction, an important step was made in the development of the heater, by a design which permitted the bus bars to be mounted directly on top of the heater, on insulators, attached to the heater frame, and having standard cold rolled steel connectors of sufficient shapes and combinations to permit

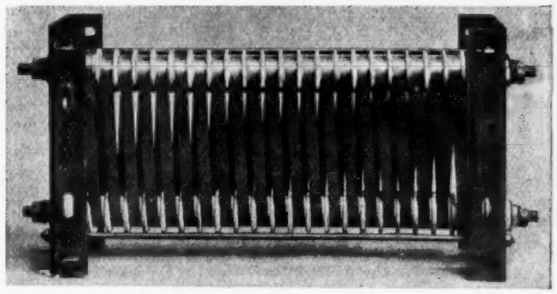


Fig. 1—Oven heater, 2.5 kw., 110 volts, connected in series for any voltage up to 550, and arranged for balancing on two or three phases

an installation of the complete equipment within the oven by a workman using only a wrench.

One of the most important developments was that of automatic temperature control for the ovens. Magnetic contactors were in use in connection with the operation of motors, and were first used in connection with ovens as remote controlled circuits, using "on" and "off" push button stations inserted in the magnetic coil circuit. Mercury and vapor tension thermostats were in use for indicating temperature or ringing alarm bells, to which were added adjustable "high" and "low" contact hands, controlling the temperature through definite limits. Suitable relays were added so that the "making" or "breaking" of the high or low contact on the thermostat would cause the main magnetic contacts to open or close, as the case may be, depending upon the temperature within the oven.

Circuit Control

Small ovens, 100 kw. capacity and under usually have the heaters all placed on one circuit, which is automatically controlled. In many installations, and particularly in large ovens the heaters are divided into two or more circuits, one of which may be a constant heat circuit not actuated by the thermostat, and of slightly less than sufficient capacity to maintain the radiation and ventilation losses, or, in other words, to maintain the operating temperature without any work in the oven. The rest of the heaters are placed on a temperature control circuit, and are cut on and off automatically as may be required to maintain uniform temperature.

Natural ventilation was used entirely with gas ovens, and for a considerable time with electric ovens. It was found, however, that on certain days a longer length of time was required for baking than on others, and investigation showed this to be due to atmospheric conditions. Investigations also showed that many explosions of gas

ovens had occurred on such days, as the result of insufficient ventilation. In ventilating electric ovens from the roof, 20 changes of air at room temperature was figured as sufficient, but later when using the floor method of ventilation, 10 changes of air at oven temperature was estimated to be sufficient to keep the volatile gases sufficiently dilute to prevent explosions.

With atmospheric conditions affecting the amount of air entering the oven, it was necessary to provide positive means of insuring a definite amount of ventilation at all times. Furthermore, it was difficult for oven builders to design the ventilating system so as to give the required number of changes of air per hour, the tendency being to err on the safe side, with the result that in most cases, under normal conditions, an excess amount of air was entering the oven, causing an excessive loss, and low efficiency of operation. To provide for these conditions, motor driven exhaust fans were used for exhausting a definite amount of air per hour from the oven, insuring positive ventilation, provided the exhaust duct remained open to the atmosphere at all times.

Condensation of Vapors

In the baking of enamels, there is given off, in addition to the volatile vapors, a vapor containing oil and asphaltum compounds, in the form of a brown smoke. A tarry substance condenses from this vapor upon reaching a temperature below its distillation point, which is usually at some part of the vent duct external to the oven. This substance solidifies, cokes, and in course of time will gradually fill up the duct unless means are taken for keeping the ducts clean. The gradual restriction of the cross section does not become apparent, and has resulted in many disastrous explosions.

In order to eliminate the possibility of explosions due to vapors condensing and solidifying in the vent ducts, a system has been perfected which, in connection with a motor-driven exhaust, automatically shuts off the power the instant the exhaust duct becomes restricted in any manner, or in the event the runner of the exhaust fan becomes loose on its shaft, as happened in one case.

When electrically heated ovens first came into use, gas ovens were being operated at temperatures from 300 to 350 deg. F., and the baking period was from 3 to 4 hr. With electric ovens the baking period was reduced to less than one-half, and with enamels baking at 450 deg. F., the baking period was reduced to 1 hr., and in some cases to 30 min. However, too short a bake is injurious to the enamel, since the vapors are driven off too quickly, not allowing the enamel sufficient time to flow smoothly, also causing craters, due to the rapid expulsion of the vapors, which craters do not have time to heal over before hardening.

Rate of Heating

In the proper baking of enamels, it is essential that the work and the enamel be heated uniformly, hence the larger the mass the slower it should be brought up to its maximum temperature. Enamel on being heated softens and tends to flow. In fact, it will flow excessively if the heating is done rapidly. A certain amount of softening is essential to produce a smooth finish, but actual flowing and dripping of the enamel off the work should be avoided, since that is not only a waste, but results in lumps being formed at the points where the dripping takes place.

Two things are essential in the baking of enamels, a uniform protective coating of enamel, and maximum adhesion between the enamel and the work. The greatest amount of adhesion and the thickest and smoothest surface of enamel is obtained when the work is heated at such a rate as will permit the metal to become uniformly heated at the same rate as the enamel on its surface. Many defects in enameling are traceable to ignoring or being in complete ignorance of this fact.

Much trouble is experienced by manufacturers of automobile fenders with the rivets and heavy rims coming out of the oven bare or only partly covered. The cause is usually attributed to oil or grease and to improper cleaning, and after more thorough cleaning of the parts, it is found that the trouble has not been appreciably remedied, the bare spots having to be touched up by hand. The real cause is that, the work being run into a hot oven or subjected too rapidly to a high temperature, the sheet metal heats up rapidly, but the rivets and heavier parts lag in temperature sufficient to permit the enamel to flow entirely off that part.

In one installation, where a continuous conveyor type oven was used for fenders, the work had been coming out of the oven with practically all the rivets bare. There were also bare spots on the sheet metal. These bare spots had been attributed at first to improper cleaning of the fenders, but after trying many remedies, it was evident that the trouble was due in some way to the heating process. An investigation of the oven while in operation revealed the cause of the bare spots on the sheet metal work.

The oven was of the elevated tunnel type, with an approach rising to a height of approximately 8 ft., in a distance of 15 ft. Ventilation was accomplished at the floor line, one outlet being half-way up the approach, one at the end, and one in the center of the oven. The heavy tarry vapors were being drawn into the unheated approach, where the walls were found to be covered with the condensate, showing that the walls were at a lower temperature than the vapor. The condensate on the ceiling was dripping down on the work, and wherever it stuck, the enamel was washed off clean.

Preventing Bare Spots

A horizontal approach 20 ft. long was added to the inclined approach, and one-third of the heaters taken out of the oven and placed in the inclined approach, producing a long preheating chamber and a baking chamber. The first batch of work coming through the oven after this change not only had no bare spots on the sheet metal work, but every rivet on the fenders was perfectly covered with enamel. The proper preheating of the work had solved the problem entirely.

In another instance where a semi-continuous conveyor oven was used, the work was run immediately into a hot oven, the baked work passing out the opposite end as the green work entered. The oven temperature dropped from 450 to 300 deg. F., while the change was being made, due to the rapid absorption of the heat by the work. A bake was obtained in 35 min. Practically 50 per cent of all rivets on the fenders came out bare. So many fires and explosions had taken place in the ovens that if an alarm was turned in, the works fire department immediately made a dash for the enameling department without looking to note on the indicator the location of the fire, feeling sure that the ovens were on fire again.

As soon as the baked work was run out of the oven, it was taken off, dipped, and hung back on the conveyor for the second baking. The last pieces were finished at about the time the bake in the oven was completed, consequently, the work did not have sufficient time to drip before entering the oven. To make matters worse, heaters had been placed on the floor, in addition to those along the sides, in order to accelerate the rate of baking. The heaters were covered with baffle plates, but the green enamel dripping on the hot plates took fire readily.

The explosions were due to driving off the volatile

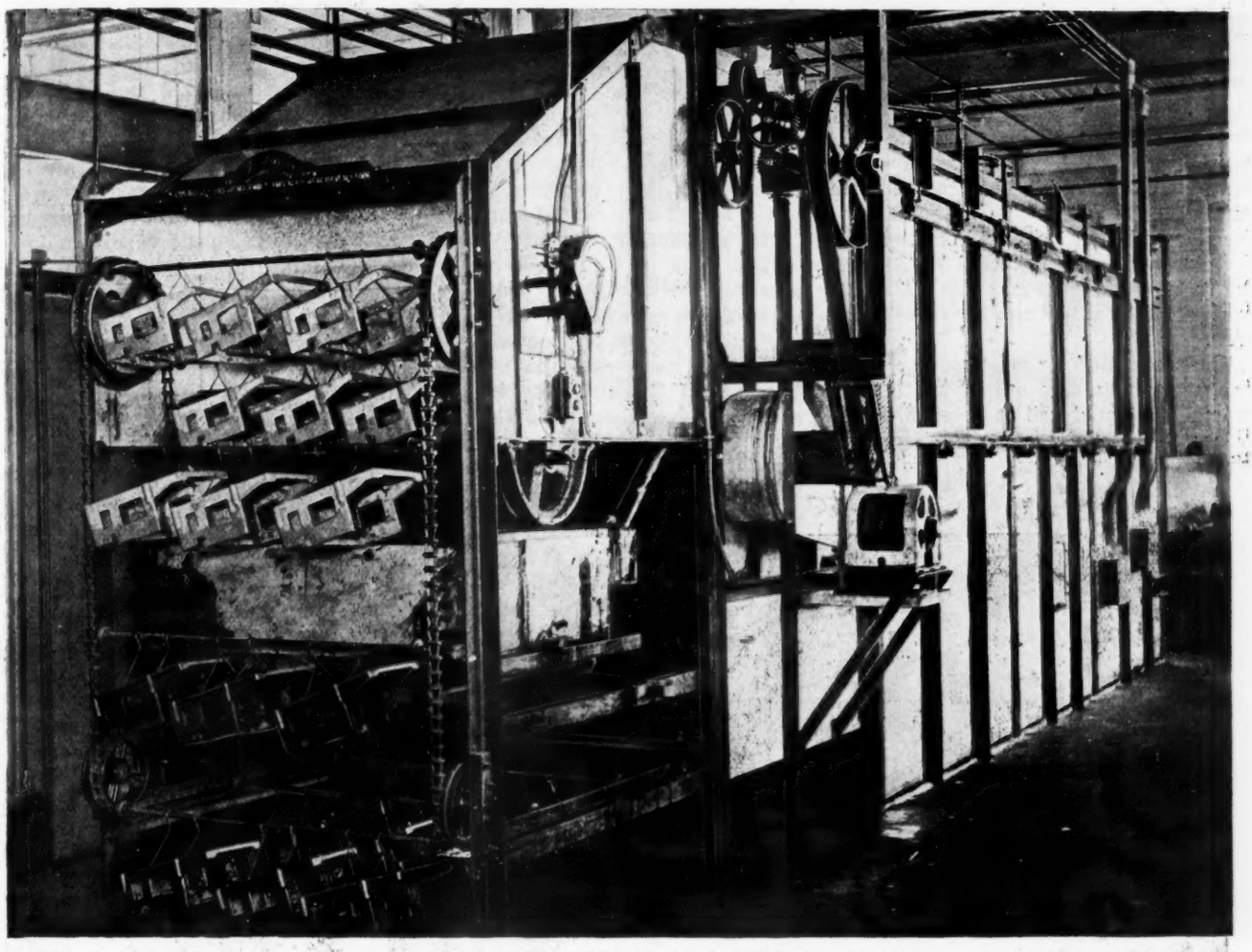


Fig. 2—A continuous conveyor type electric oven. Suitable for baking enamel on license tags, small castings and sheet metal work of various sizes and shapes. The work is hung on the conveyor, and is carried over a pulley down into a tank filled with enamel, up and down through a dripping space and then through the oven. The conveyor travels in an up and down direction as it progresses through the oven, returning near the floor and under the heaters

gases too fast for the vent ducts to handle them properly. The naphtha vapors begin to come off at room temperature, and for best results, should be entirely liberated by the time a temperature of 250 deg. F. has been reached. Therefore, it is evident, if the work is placed immediately in an oven having a temperature of 450 deg. F. and the heat turned on, the gases will be generated at an enormous rate.

The difficulties above experienced were entirely overcome by removing the heaters from the floor, lengthening the bake to 50 min., and not turning on the heaters until after the work had been in the oven for 15 min. By the end of that time, the oven had dropped to a temperature of 225 deg. F. and all the volatile gases had been driven off with entire safety. The work also had 15 min. longer to drip outside the oven. The net result was the elimination of fires and explosions; the preheating allowed the enamel to adhere properly to the rivets; less enamel flowed off the fenders, due to greater length of time allowed for dripping and setting of the enamel in the air; also due to preheating; the finished product had a much smoother and higher gloss finish.

The electrification of enameling ovens has permitted the liberation of an enormous amount of heat in an oven in a very short period, consequently, with the necessity for production confronting the user, he is apt to attempt to speed up the baking operation to the limit. The man responsible for the capacity and type of equipment being installed may not have sufficient information in connection with that particular plant operation to predict exactly the results finally obtained. For this reason it is not sufficient to convince a customer that he should purchase electrically heated ovens, and obtain his order, but it is even more essential that an inspection be made of the installation when in operation and results obtained, for the purpose of assuring success.

Conveyor Type Ovens

Before the adoption of electric heat, oven operations were practically limited to batch processes, due to the difficulty in controlling the temperature, securing and maintaining the correct temperature distribution. The use of electric heat has been responsible for the development of continuous conveyor type ovens of all types, shapes and forms to fit in best with a manufacturer's particular process or location.

The installation of electric ovens at the Cadillac Motor Car Company, Detroit, Mich., is an example of the development of the art of baking enamel on automobiles, and is a tribute to the work of the pioneers in industrial electric heating. This magnificent installation also shows the confidence of a large automobile manufacturing company in the superiority and economy of electric heating.

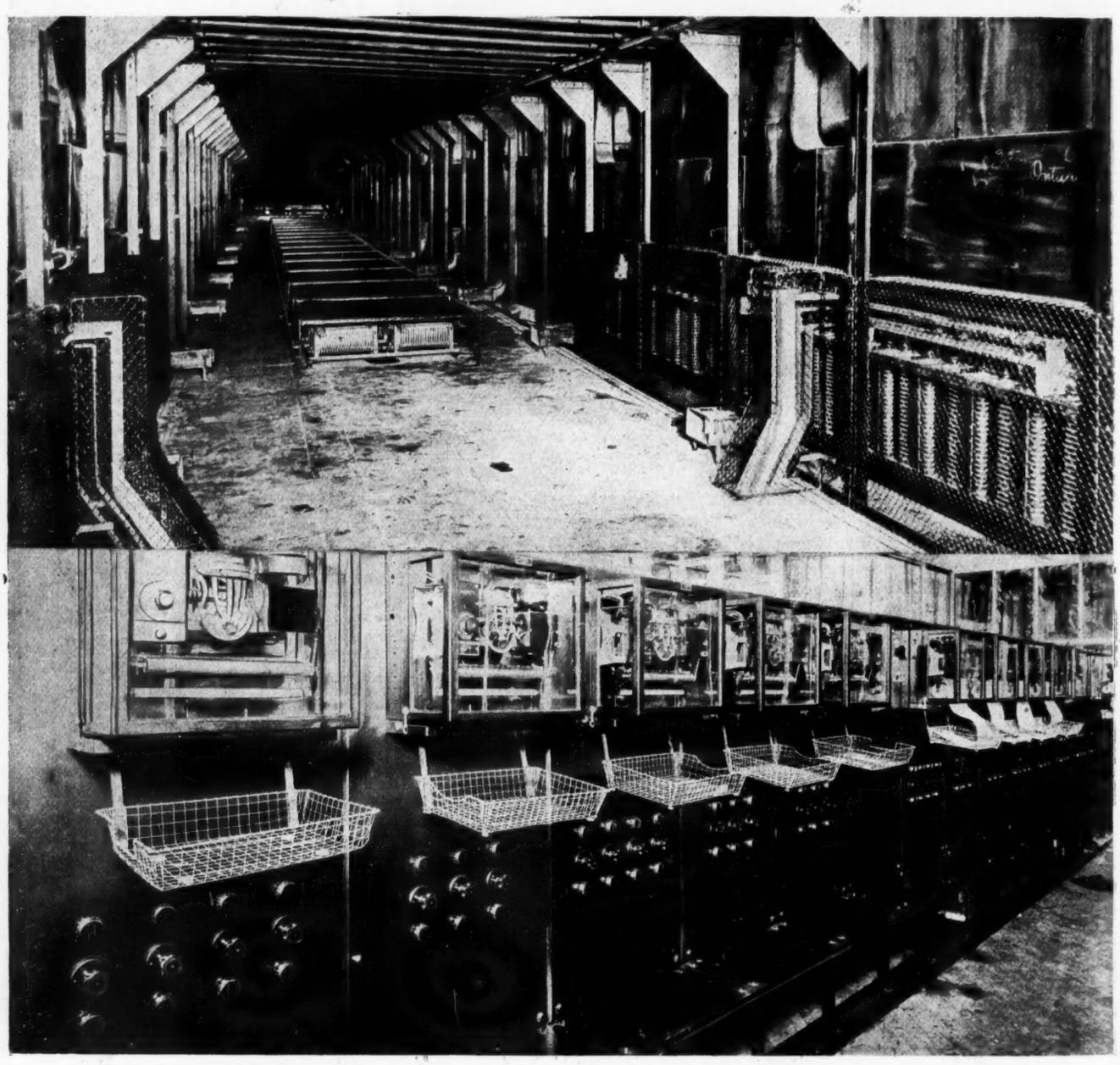
The ovens are designated for a capacity of 100 cars per 9 hr. day, 26,000 lb. of work being baked in 4 ovens each hour. The ovens are the continuous conveyor tunnel type, elevated so as to allow an inclined entrance and exit to give an air seal at each end. The work is hung on

the conveyor, is dipped automatically in enamel, and passes through four ovens in succession, the dipping each time being done automatically.

In the first half of each oven, the heaters are placed along the side walls, and approximately three-fourths of the total amount of the air required for ventilation is exhausted from this section, at the floor line. In the second half of the ovens heaters are placed on the floor, the ventilation in this portion being partly from the floor near the side walls, and partly from the ceiling. Heaters along the side walls are protected by fire screens, and those on the floor by sheet metal baffle plates, in case any pieces of work should fall off the conveyor in passing through the oven.

The amount of air required for ventilation in each oven was accurately determined as follows: Samples of the enamel were analyzed to determine the amount of solvent present. A definite amount of solvent vapor and air was injected in a small test oven, completely filling it, and attempts made to ignite it by means of an arc from a spark plug placed in the center of the oven. The reasons for using an arc as a basis for these tests is that in any electrical installation, an arc is apt to occur, and should that condition exist, it is essential that the gas mixture within the oven be sufficiently lean to make an explosion or fire impossible.

It was found that a mixture of 92 per cent air and 8 per cent solvent vapor (both percentages by weight) would cause an explosion of a mild form. A mixture of 93 per cent air and 7 per cent solvent vapor would take fire, but not explode. A mixture of 94 per cent air and 6 per cent solvent vapor could not be made to take fire. Allowing for an ample factor of safety, a mixture of 95 per cent air and 5 per cent solvent vapor was recommended. As the percentages of solvent vapor increased, the explosions increased in violence until they reached a maximum with 85 per cent air and 15 per cent solvent vapor. Increasing the solvent vapor beyond this point, reduced the amount of oxygen present in the air to a point where it was insufficient to oxidize the enamel.



Top—Interior view of one of the ovens of the Cadillac Motor Car Company. Note vent ducts on floor, projecting out from sides. Bottom—Temperature control panel, from which point the constant heat and temperature control circuits are operated. Switches with red and green lamps indicate when each circuit is on or off. The instruments shown are on temperature control circuits

Defining Saturation Point, Engineer Makes Unique Comparison

P. M. HELDT approaches the question from an unusual viewpoint in that being an engineer, he compares it to the magnetization of iron—really the law of diminishing returns—and he defines it as that point at which the rate of increase in production begins to decline.

FOR a number of years past the term "saturation point" has been frequently used in speaking of the condition of the automobile market. Some writers and public speakers have asserted that the market in this country had reached this point or was about to reach it, while others have poohpooed the idea of such a point, holding that there never was one and never will be one.

Before we can discuss the subject intelligently it is necessary that we have a clear understanding of just what is meant by the saturation point. The term is used to a certain extent in science, and particularly in connection with the magnetization of iron.

When a gradually increasing magnetizing force is applied to a core of iron or soft steel, the magnetic flux in the core, or, in other words, its magnetic strength, increases at first in direct proportion to the magnetizing force.

It is observed, however, that after the magnetizing force and the resulting magnetic flux have reached certain values, the increase in the flux for a certain increase in magnetizing force begins to fall off, and the line which represents the relation between magnetizing force and flux then begins to curve, its deviation from the straight line becoming greater and greater as the magnetizing force is increased. The point at which the line begins to curve is known as the saturation point.

It is to be noted that the amount of magnetism which can be induced in the iron can be still greatly increased after the saturation point is reached, but from this point on it requires—using popular terms—greater effort to effect a certain increase.

When we plot a diagram of automobile sales we generally plot years on the horizontal scale and numbers of cars sold on the vertical scale. The horizontal distances then represent the age of the industry, provided, of course, we plot our curve to represent sales from the beginning.

How Sales Increase Would Be Plotted

We then find that the line representing the increase in sales with the years is not a straight line like the magnetization line, but, on the contrary, is a curve convex to an horizontal axis. This curve, moreover, is not as smooth as the magnetization curve. The magnetization of iron and steel is a relatively simple natural phenomenon in which, besides the qualities of the particular grade of metal, there are only two factors involved, the magnetizing force and the magnetic induction or flux. The growth of the automobile market, on the other hand, is a much more complicated phenomenon. As long as only a small proportion of the population owned cars, the conditions favored rapid growth of the market. After the automobile had once become a practical vehicle, every new purchaser soon became an enthusiast and through him a number of his friends usually became interested and bought cars. The growth in the number of purchasers therefore was a sort of geometric progression. It is really remarkable how smooth or continuous the curve of automobile production up to 1917 is when we consider the momentous events of the past decade that tended to produce "cross currents" as it were. This comparatively uniform variation in the rate of production is undoubtedly based on the fact that practically every family in the country wanted an automobile and every increase in value offered by the manufacturers and every price drop brought increasingly large numbers of new buyers.

It is possible to analyze this curve of automobile production and derive mathematical equations which represent the relationship between the number of cars sold per year and the age of the industry. At least if we take a portion of the curve covering a period of several years we can derive an equation which represents very closely the relation between the production and the age of the industry.

If we were dealing with some simple natural phenomenon in these curves, we would be justified in extending them beyond the points based on actual observations.

Can Rate of Production Increase?

It seems impossible that the rate of production of automobiles in this country cannot continue to increase according to the same law by means of which it has been increasing during the past ten years or so. Roughly speaking the production has doubled every four years, and if this rate of growth were to continue, in another ten or twelve years we would be making enough cars to give each family in the country a new machine each year.

The curve of automobile production therefore cannot continue strongly convex to the axis of years (we are referring here, of course, to a linear scale chart and not to a logarithmic chart). An inflection point will be reached and thereafter the curve will be concave to the horizontal axis. Now, the saturation point is evidently the point where the rate of increase in production begins to decline —in other words, the inflection point of the curve.

The total production will still increase thereafter, but the fact that there is an inflection in the curve proves that a change in conditions has taken place. The point that should be emphasized is that the annual production will still increase after this saturation point has been reached. This point may have been passed already; if it has not it is a moral certainty that it will be attained before long. Just when we passed it can be determined only years after, on account of the effect of the "cross currents" on the production curve.

The saturation curve as thus defined certainly does not spell the doom of the automobile industry; it simply means the attainment of a certain stage through which every industry must pass in the course of its development.

Exports of Cars, Trucks and Tires for

COUNTRIES	GASOLINE PASSENGER CARS								TRUCKS						ELECTRIC VEHICLES	
	Up to $500		$500 to $800		$800 to $2,000		Over $2,000		Up to 1 ton incl.		1 to 2½ tons		Over 2½ tons			
	No.	Value	No.	Value	No.	Value	No.	Value	No.	Value	No.	Value	No.	Value	No.	Value
Austria			3	$2,560			1	$3,207								
Azores and Madeira Islands																
Belgium	11	$5,446	10	7,823	34	$46,572	3	8,899								
Bulgaria																
Czechoslovakia					8	8,761										
Denmark			2	1,511			3	9,266			4	$4,589	2	$4,174		
Esthonia																
Finland					6	6,371										
France	14	6,660	9	6,829	16	19,820	6	19,431	2	$1,000						
Germany	4	1,830	47	40,977	41	55,789	35	88,411	6	2,855						
Gibraltar			1	771												
Greece	3	1,504	17	13,148	23	27,972	4	12,893								
Hungary			2	1,504	2	3,864										
Iceland																
Italy	92	24,445					11	33,427	400	99,070						
Latvia							1	2,525								
Lithuania																
Malta, Gozo and Cyprus Islands																
Netherlands	3	1,596	6	4,385	39	47,622	17	46,519	2	2,149						
Norway			20	11,755	10	10,577			3	3,546						
Poland and Danzig			1	858	5	4,918	1	2,500								
Portugal					2	2,186										
Rumania			8	6,888	3	2,931										
Russia																
Spain	56	25,402	46	36,650	117	152,095	5	16,400			3	3,283				
Sweden	6	2,100	53	37,384	55	52,424					1	1,284				
Switzerland	5	2,390	17	14,190	41	50,451	1	2,287								
Turkey	1	400			2	2,940										
England	37	16,862	169	127,179	265	327,949	8	22,150	23	16,854	6	7,146				
Scotland							1	3,700								
Ireland	2	822	3	2,260	19	19,201			1	610						
Yugoslavia, etc.																
United States																
Canada	132	38,322	276	182,688	410	475,332	22	55,514	118	66,996	25	41,582	8	27,020		
British Honduras					1	1,140										
Costa Rica	2	1,026			4	3,352										
Guatemala	2	900	4	3,100	8	10,788			1	560						
Honduras	1	400	3	2,290												
Nicaragua			1	861	6	7,251										
Panama	16	7,715	12	8,616	26	31,856			2	2,130					7	$10,346
Salvador			6	4,615	13	14,146										
Mexico	444	149,084	56	35,302	123	124,134	13	34,342	95	36,651	18	33,505	1	4,508	10	7,440
Miquelon, Langley and Fiume	1	250	1	719					1	300						
Newfoundland and Labrador	8	3,775	1	754	3	3,553										
Barbados	2	728														
Jamaica	14	6,171	14	11,797	7	6,769			15	5,084	1	2,100				
Trinidad and Tobago	15	6,333	2	1,595					6	2,136	2	2,108	1	3,480		
Other British West Indies	5	1,923			4	4,934			1	452						
Cuba	694	214,373	162	96,239	72	77,632	19	54,644	163	44,866			4	12,380		
Dominican Republic	14	4,656	3	2,422	16	18,466	1	3,029	3	1,304						
Dutch West Indies	3	1,354			1	984										
French West Indies	1	464														
Haiti	12	5,216	1	700	5	6,316	1	2,500	4	1,676						
Virgin Islands																
Argentina	442	221,954	277	200,194	288	347,338	17	48,435	20	23,192	9	14,033	13	43,050		
Bolivia			1	698					8	3,264						
Brazil	78	28,861	89	62,378	76	87,599	11	30,528	25	5,851	5	4,348				
Chile	140	29,501	24	18,838	31	37,393	5	13,809	105	35,118	10	14,687	8	21,925		
Colombia	34	13,331	10	7,516	33	44,639	2	5,606	18	7,688	7	11,690	2	8,568		
Ecuador	2	746	5	3,769	19	21,208	1	2,800	22	8,636	1	1,813				
British Guiana			5	3,980	1	903										
Dutch Guiana																
French Guiana																
Paraguay									1	296						
Peru	55	20,610	33	26,130	38	47,840	2	6,560	55	21,247	6	8,550	2	5,534		
Uruguay	172	45,410	19	14,631	35	39,544					1	2,080				
Venezuela	40	15,825	24	17,703	32	37,128	4	13,931	38	29,118	3	9,511	2	5,470		
Aden					1	2,000					1	3,000				
British India	39	18,063	66	47,921	32	33,995	1	3,700	37	27,501	22	22,159				
Ceylon			19	13,522	7	8,430			18	12,073	9	12,500				
Straits Settlements	19	9,653	5	3,050	9	9,229										
Other British East Indies	2	1,040														
China	1	477	14	10,167	6	8,221	1	2,500								
Chosen			1	610												
Java and Madura	10	4,850	27	20,961	42	50,579										
Other Dutch East Indies			18	11,898	16	18,759					4	4,936				
Hejaz, Arabia, etc.	53	16,144														
Hongkong			2	1,715	13	13,595	4	9,683								
Japan	24	8,201	30	21,412	79	106,044	8	25,071			7	19,215	8	28,250	1	1,180
Kwantung																
Palestine and Syria	20	6,354	13	9,798	22	25,626	2	4,414								
Persia	4	1,184			1	900										
Philippine Islands	59	24,136	23	16,776	73	94,051	6	15,000	43	15,502	5	8,965				
Russia					3	4,660	4	11,763								
Siam																
Turkey																
Other Asia	4	1,456														
Australia	1,726	635,442	974	648,260	1,019	1,185,827	28	71,839	253	149,585	193	267,891	147	286,011		
British Oceania			3	2,392	1	1,103										
French Oceania																
New Zealand	27	12,229	91	68,502	176	196,403	5	19,051	60	61,955	42	61,950	15	34,290		
Other Oceania			3	2,430	1	1,321										
Belgian Congo	2	680							3	780						
British West Africa	1	425	3	2,575	2	1,976			6	2,544	53	56,604				
British South Africa	44	21,146	139	104,263	245	270,030	2	6,696	3	2,420	13	16,682				
British East Africa	98	46,301	7	4,413	23	24,402										
Canary Islands			4	3,189	20	22,422	1	3,299			12	12,816				
Egypt	3	1,490	6	4,560	1	1,261					1	1,632				
Other French Africa	9	3,576							14	5,376						
Liberia									1	317						
Morocco	36	12,976	3	1,777					12	4,896						
Portuguese East Africa	3	1,545	6	4,785	2	2,306			6	3,825						
Other Portuguese Africa	10	4,200	1	798					34	13,775						
Spanish Africa			6	4,114					1	500						
Total	4,757	$1,739,953	2,907	$2,034,095	3,734	$4,375,828	257	$716,329	1,629	$723,698	464	$650,659	213	$484,670	18	$18,966

September, 1924 | Canadian Exports

PARTS	TIRES						PASSENGER CARS						TRUCKS		PARTS	COUNTRIES
	Casings		Inner		Solids		Up to $500		$500 to $1000		$1000 and over					
Value	No.	Value	No.	Value	No.	Value	No.	Value	No.	Value	No.	Value	No.	Value	Value	
$10																Austria
401																Azores and Madeira Islands
54,318	601	$21,401	310	$1,587											$1,180	Belgium
22	20	348														Bulgaria
532																Czechoslovakia
221,036	2,753	34,349			136	$5,463	52	$18,480							2,444	Denmark
61																Esthonia
991	546	7,525	1,068	2,589												Finland
613,792	797	13,186	240	668												France
13,712	143	1,684	60	106	11	253									5	Germany
																Gibraltar
6,039	195	2,952	530	768	143	3,950									201	Greece
280																Hungary
	21	234														Iceland
43,499	446	3,823	306	490												Italy
	190	2,485	362	685												Latvia
228																Lithuania
571	100	978														Malta, Gozo and Cyprus Islands
115,080	1,774	25,576	1,530	2,996	6	120									2,240	Netherlands
13,111	913	16,622	1,490	3,557	89	3,147										Norway
2,347	16	304														Poland and Danzig
1,808	227	3,575	805	1,440	2	62										Portugal
792																Rumania
13,801																Russia
64,023	1,133	12,685	337	558	213	6,051									35	Spain
44,474	780	11,316	2,983	4,287	22	839									32	Sweden
7,260	1,024	15,708	833	1,754					7	$6,866					5	Switzerland
837																Turkey
313,892	14,707	177,637	6,377	13,698	3,192	68,547	140	54,320	223	183,005	148	$266,009	168	$67,787	15,048	England
12,850	124	838	15	22	54	1,542										Scotland
26,114																Ireland
708																Yugoslavia, etc.
							10	1,875	4	2,875	1	1,500			5,946	United States
885,051	1,521	21,470	656	2,534	106	5,374										Canada
240	10	129	4	10												British Honduras
5,285	86	953	36	56	4	110									59	Costa Rica
1,224	78	1,312	82	151	4	82					3	3,248				Guatemala
1,438	20	284	40	78	40	1,639										Honduras
842	6	62			6	302										Nicaragua
8,002	374	5,317	239	516	60	1,170										Panama
1,940	226	4,682	349	1,195	28	891										Salvador
86,363	8,066	70,766	4,694	9,215	129	4,529									3	Mexico
	1	25														Miquelon, Langley and Fiume
1,148	79	744	82	128			11	3,626	1	620					1,450	Newfoundland and Labrador
1,660	32	321	32	46											154	Barbados
8,298	374	3,811	767	982	161	3,241	12	5,138	6	3,282	1	1,311			91	Jamaica
4,686	120	1,207	20	23	40	1,460	1	429	1	505	1	1,178	1	445	2	Trinidad and Tobago
4,906	69	752	370	502	12	181	3	1,304	1	505					79	Other British West Indies
99,078	9,780	90,825	10,775	16,770	869	22,670					12	15,677				Cuba
5,961	1,932	10,967	676	835	43	1,142	2	996								Dominican Republic
1,336	138	1,132	316	440	8	120										Dutch West Indies
790	24	573							4	3,857						French West Indies
4,090	171	3,154	259	571					1	570						Haiti
302	38	345	50	61	1	32										Virgin Islands
936,712	9,036	99,135	4,635	6,442	160	3,928	94	41,321	117	65,670	49	62,278			14,002	Argentina
1,121	2	170	2	20	4	152			2	1,928						Bolivia
277,995	147	2,036	46	153	58	1,259	10	4,154	20	12,934	5	6,251			6,160	Brazil
28,834	544	9,405	90	265	2	169	2	663							13	Chile
18,997	886	11,947	1,585	2,697	46	2,189			1	964	2	2,621				Colombia
2,093	128	1,733	158	289							1	1,311			67	Ecuador
1,730	42	266	18	18			9	3,267	3	1,515	1	1,316			33	British Guiana
198			30	35												Dutch Guiana
32					5	105										French Guiana
106																Paraguay
32,007	1,888	24,549	2,081	3,916	31	962	6	2,593	4	3,031	4	5,106				Peru
15,703	2,306	158,582	693	1,075	25	464									213	Uruguay
15,589	1,130	16,797	1,188	2,656	4	219	2	810	6	3,866	2	2,487				Venezuela
402																Aden
29,828	1,349	20,544	497	990	82	2,074	331	129,904	18	10,779	23	25,229	157	57,436	20,918	British India
2,887	340	2,845			53	1,303	16	6,346	3	1,991	1	1,178	40	15,100	2,518	Ceylon
10,423	5	112					110	37,873					38	12,393	24,071	Straits Settlements
1,309																Other British East Indies
18,165	701	9,887	561	1,086	36	743	9	4,047								China
1,772	100	883	200	280												Chosen
14,067	1,955	18,152	989	1,574	343	7,902										Java and Madura
4,866	118	1,142	90	100	5	95	102	33,118	7	3,551	6	7,821	38	12,118	3,163	Other Dutch East Indies
427																Hejaz, Arabia, etc.
2,884	41	410	45	40	28	296	2	871								Hongkong
34,885	1,271	20,480	1,462	2,946	174	4,211			6	3,018						Japan
2,104																Kwantung
6,777	106	2,589	149	497					1	501						Palestine and Syria
125	104	1,123	120	301												Persia
29,637	5,768	53,810	2,449	4,210	191	5,364									507	Philippine Islands
504	112	2,227	224	574												Russia
131					4	112	9	2,854	3	1,618			32	10,730	593	Siam
247																Turkey
																Other Asia
228,396	3,970	57,234	3,048	5,254	407	11,062	63	28,572	12	6,176	19	24,656	48	15,648	59,136	Australia
491	9	138	10	32												British Oceania
1,181	2	43			2	110										French Oceania
70,545	1,492	22,315	158	335	205	6,810	88	39,417	85	62,874	28	35,212	148	54,370	15,286	New Zealand
642	11	138	21	51			1	415	1	692						Other Oceania
1,995																Belgian Congo
6,085	260	4,122	126	227			22	7,204					14	4,237	5,956	British West Africa
68,838	1,001	14,813	1,679	3,071	8	292	99	40,782	32	18,255	6	7,074			673	British South Africa
7,836	82	886	20	34			69	24,506	2	1,545			63	21,302	3,483	British East Africa
3,284	282	3,652	286	667	37	875	4	1,632			1	1,293				Canary Islands
6,785	214	1,806	269	355	22	613									569	Egypt
11,919	12	167														Other French Africa
244																Liberia
3,711									1	501					9	Morocco
1,066	14	200	28	50			8	3,494	4	2,051			3	978	23	Portuguese East Africa
3,366	12	289	44	74												Other Portuguese Africa
1,149																Spanish Africa
$4,605,319	85,095	$1,136,684	59,694	$109,632	7,311	$184,226	1,289	$500,011	576	$405,545	314	$472,756	750	$272,544	$186,367	Total

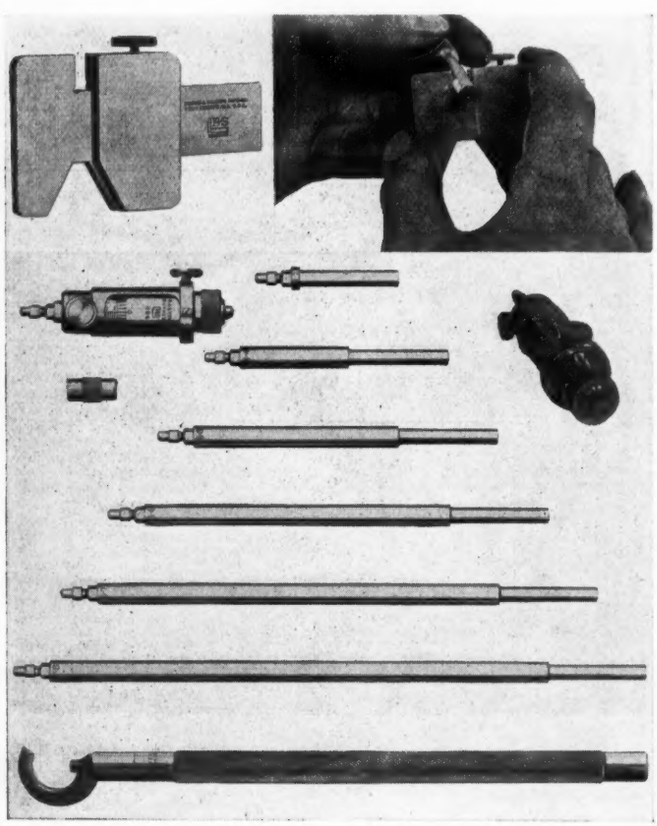
New Shop Tools Designed to Cut Production Cost

Inside micrometer, a thread tool gage and an inside micrometer handle are machinist's tools recently placed on the market.

ILLUSTRATIONS are shown herewith of some new machinists' tools placed on the market by the Brown & Sharpe Mfg. Co. of Providence, R. I., including an inside micrometer (No. 264), a thread tool gage (No. 577) and an inside micrometer handle (No. 287).

With the No. 577 gage it is possible to check thread cuttings tools ranging from a sharp V to a 1-in. flat. The fact that all widths of flats within given angles can be obtained makes these gages particularly convenient. Three different gages are made, to cover the U. S., Acme and Whitworth standard threads, the angles of the measuring surface being ground to 29, 50 and 60 deg. respectively.

In setting this gage, a plug gage or a piece of stock of a diameter equal to the width of the flat required, is inserted in the opening on top which corresponds with the flat at the top of the angle. An advantage is claimed for the use of this tool over that of slot gages in that a large range of pitches and both screw thread and worm thread tools can be checked by a single gage, so that this adjustable gage takes the place of a considerable number of slot gages.



Thread tool gage and method of using it
Inside micrometer set. (Two views are shown of the micrometer head)
Inside micrometer handle

The inside micrometer shown has a range of measurement from 2 to 8 in., by thousandths of an inch. It consists of the micrometer head with ½-in. measuring screw, six rods and one spacing collar. The shoulders on the rod fit in the micrometer, and when in position, with the shoulder of the rod against the head, the first half of the inch can be measured (3-3½-in., for instance). When the spacing collar is in place in the rod the last half inch (3½-4-in.) can be measured. The principal feature of this micrometer is the clamping device.

The shell of the micrometer is slit in two places, the metal in between the two slots forming a shoe which is forced against the micrometer thimble by the thumbscrew. This latter device is claimed to be an important improvement in inside micrometers, allowing the thimble to be locked at any reading and preventing its turning while in use.

The measuring ends of the rods are hardened and so designed that it is possible to adjust them to compensate for wear by loosening the lock nut and turning the screw as desired.

The inside micrometer handle is for use in connection with the inside micrometer described. It consists of a hook with an adjusting brass plug which is held against the micrometer head by turning the knurled handle. In measuring the diameter of small holes it is often difficult to hold the micrometer and get accurate measurements. With this handle the micrometer can be inserted in such holes for a greater distance than by hand alone.

Insulating Material Made from Dielectric Substances

AN insulating material which should be of interest to manufacturers of automobile electrical equipment has been developed by the Panelyte Company of Trenton, N. J. It is said to be compounded from several dielectric substances produced by nature, including cellulose fibers, and to differ from hard fiber in being practically waterproof and more easily machined, lighter in weight and lower in cost. The surface resistivity is given as 2.4-13 x 10^6 megohms and the volume resistivity as 3.5-30 x 10^6 megohms on the inch basis. Dielectric strength tests made by the Underwriters Laboratories showed an average dielectric strength of 350 volts per mil of thickness.

The average tensile strength is given as 3835 lb. per sq. in. and the average transverse strength as 6965 lb. per sq. in. The specific gravity is 1.16, one cubic inch weighing 0.043 lb. Temperatures up to 356 deg. Fahr. have no effect on the material, according to Underwriters' tests. When ignited, the material burns mildly, but when left to itself the flame becomes extinguished and the destructive effect does not extend all the way through the panel.

Among the parts for which Panelyte insulation is used may be mentioned charging rheostats, switchboxes, switchboard panels, fuse blocks and solenoid switches.

EDITORIAL

Bodies of Tomorrow

WITH the Fisher Body Corp.'s announcement of a new line of coach bodies, a new field for speculation is opened. Yesterday the closed car was considered a luxury. Today many people who have only one car consider it a necessity. The ratio of closed cars produced has increased from 1.5 per cent in 1915 to 34 per cent in 1923. A further increase of 10 per cent in 1924 has been predicted.

While Hudson is the only company selling a closed car for less than its open model, Marmon has announced a sedan recently for only $130 more than its open jobs, Reo has announced a sedan at the same price as its sport touring, Studebaker has its duplex models, and the Overland coupe-sedan has been reduced to within $55 of the price of its open models.

Because many people are coming to prefer closed cars, their production is increasing, and the collapsible topped open car of today might well become the sport car of the future.

Dolling Up Helps Sales

LARGE production of a single body model without any variation, even in painting, has certain marked advantages in the way of decreased manufacturing cost, but it has the disadvantage that every car turned out looks exactly like every other one. In other words there is a decided lack of individuality.

Now a certain degree of individuality is a very desirable thing from a sales standpoint—so desirable, in fact, that the customer is quite willing to pay a substantial amount more for a car which is different.

One answer to the problem of giving individuality and still disposing of a large number of entirely standard cars has been found by some dealers. In one case which we have in mind a car which lists at about $1,000 and is made in very large numbers, is sold at about $200 above list price by the simple expedient of adding some useful equipment and a little extra paint. About half of the extra price is clear profit over and above the profit on the standard model.

In this particular case the painting consists only of striping on the body, hood and louvres with some extra color added around the windows, while the extra equipment includes bumpers, automatic windshield wiper, nickel radiator shell, spot and stop lights. About twice as many of these "special jobs" are sold as are jobs of strictly standard pattern, while profits increase accordingly.

Too much in the way of special paint jobs will upset a manufacturing program industry, but there is no reason why dealers with proper facilities at hand cannot provide at least some decorative coloring at small expense and in much greater variety than the manufacturer can afford to do. To aid him the manufacturer might well furnish suggestions in the form of colored cuts showing pleasing effects which are easily and cheaply obtained, or possibly even furnish kits containing the necessary colors. There are few towns of much size which do not have at least one shop competent to do such special paint work as is suggested, and dealers who have their own paint shops might use them to advantage in this way during dull seasons.

Killing 'Em Off

WHAT'S a laboratory or experimental department for, anyhow? Presumably to learn facts concerning the nature and performance of the device or product tested in order that the organization concerned may profit by the information gained.

In practice, however, it is very easy to acquire an attitude which makes this department chiefly a place for the mere "killing off" of the thing tested. Under such circumstances those who make the test get into the habit of trying to find as many "bugs" as they can in the particular product under test and often overlook entirely its good points and the lessons which the test might teach.

Now it is easy to excuse such a condition. All factories are bothered by fakes and inventors who have small knowledge of the practical considerations which their invention must meet to be of value. But this is no excuse for not giving reasonable consideration to devices, systems and the like submitted by qualified individuals and concerns.

If a new product seems to have advantages and is to be tested at all, it is not fair to test it in such a way as to bring out only its faults without the least effort to find it good points, weigh them against disadvantages and profit by the lessons that both teach. The laboratory may gain knowledge from tests which fail as well as from those which succeed.

Trade Statistics Needed

AMONG the legislative measures placed before President Coolidge by the U. S. Chamber of Commerce this week, the one advocating amendment of anti-trust laws to permit publication of trade statistics should get particularly strong support from the automotive industry. Automobile men would be far better able to handle their various buying and selling problems if they had available adequate trade statistics for various contributory industries. The U. S. Chamber of Commerce practically has asked either that present uncertainty as regards the legality of collecting trade statistics be dispelled or that if necessary specific amendments be made to the present law to clear up the situation. Certainly this is a logical and just request.

Our Industry Today—

More Optimistic Feeling Follows Election—Buying Power Increased—General Cut in Prices Unlikely to Be Made by Makers

NEW YORK, Nov. 17—Indications of a better feeling throughout the industry as a result of the election are becoming more apparent, although no immediate effect of note on the sale of cars and trucks can be expected. Reports from the trade point to a strong resumption of buying next year, based on the more optimistic outlook of prospective buyers and on the more stable conditions in business generally.

How good the past year has been despite the drawbacks experienced is shown in preliminary figures on the output for the twelve months. These figures, with totals for the last two months estimated, place the output of cars and trucks at 3,550,000 with 3,200,000 passenger cars and 350,000 trucks produced. November and December will not reach high levels but they will show totals on an entirely satisfactory level.

In estimating a good buying year for 1925, manufacturers are taking into consideration the potential farm and foreign market. Both of these fields, it is believed, will absorb a much greater output than has been the case in the year now closing. This is especially true of the farmer whose initial purchases so far after a long period of indifferent buying have given a rosier hue to the outlook for spring sales in agricultural sections.

Truck Outlook Bright

Parts makers for the time being are keeping pace with the lightened activity in the car producing field but like the latter are prepared to augment production schedules as quickly as demand warrants. Conditions in the parts branch of the industry are good, with collections satisfactory.

Among truck producers little change is noted from previous weeks. Whatever movement has been apparent in this branch has been cautiously taken though the outlook is brightening for increased sales and greater manufacturing operations.

Slight Price Fluctuation

Although there has been a slight fluctuation in prices of cars on the part of makers there is nothing to indicate any wide downward revision. There will always be more or less of a price movement but no conditions prevail today as were felt a year or so ago. Manufacturers feel that at no time has the public been given greater value for their money and believe generally that prices are as low at the present time as they can consistently be. That there may be a movement upward in lists is thought probable although there is nothing to warrant the belief that it will be of any sweeping nature.

175 Attend Meeting of N.A.C.C. and S.A.E.

Balloon Tires Subject of Lively Discussion—Alvan Macauley Presides

CLEVELAND, Nov. 19—A joint service meeting of the National Automobile Chamber of Commerce and the Society of Automotive Engineers held here at the Hotel Winton during the last two days drew a registered attendance exceeding 175.

Alvan Macauley, president of the Packard Motor Car Co., presided at both sessions of Tuesday and was followed on Wednesday by Clyde Pelton, president of the Perfection Heater Co., and John Younger. The outstanding feature of the meetings was the discussion precipitated by the paper read by James E. Hale of the Firestone Tire & Rubber Co. at the last meeting, entitled "What the Service Department Needs to Know About Balloon Tires." Service men and engineers in great number advanced many different viewpoints on inflation pressures, tire valves and front wheel shimmy.

During the first meeting L. V. Polsifer of Valentine & Co. spoke of "The Influence of the New Nitro-Cellulose Paints for Automobiles Upon the Service Department," illustrating his talk with finished panels and simplified laboratory demonstrations showing the characteristics of the component materials. He was followed by A. M. Dudley of the Westinghouse Co., who outlined the work of the Automotive Electric Association in his paper, "Standardization Work of the Automotive Electric Association and Its Possibilities in Simplifying Electrical Service."

"A tempest in a teapot, but still a nasty one while it lasted," was the way Thomas Midgley, Jr., characterised the recent gas agitation in the East.

He stated that the regrettable fatalities occurred in conjunction with a new semi-works process, but ethyl gas is and has been made for some time in much larger quantities in other plants without a mishap of any kind. The United States Bureau of Mines as yet is unable to discover any injurious results from use of ethyl gas in motor vehicles.

Mr. Midgley also discussed "The effect of ethyl gas on engine operation." George H. Duck of the Chilton Co. spoke on "The Need of More Engineering in Service."

During the second day, in addition to Mr. Hale's talk, S. V. Norton of the General Motors Truck Co. spoke on "Utilizing Motor Truck Service Records."

Clayton Hill, assistant manager of the society, read a paper, "Organization and Conduct of a Modern Service System," by H. N. Davock, service manager of the Packard Motor Car Co., who was unable to attend.

"The Training of Mechanics" was the subject of a paper by John Younger.

Many of those in attendance plan to stay over Thursday to visit various automotive plants in the vicinity.

Willys-Overland Cuts Its Inventory Period

TOLEDO, Nov. 18—Indication of a definite improvement in automobile business is noted here in the announcement of the Willys-Overland Co. today that it had called back about 3500 of its men to go to work in 26 departments Wednesday. The plant closed for inventory last Friday and had to cut short the usual two weeks period to three days.

The rest of the men are expected to be back at work before Monday. In all, the force may be brought up to 7500 men.

Recently the company has been working about 5000 men and turning out 500 cars a day.

Earnings for Quarter

TOLEDO, OHIO, Nov. 19—Net income of the Willys-Overland Co. for the three months ended Sept. 30, 1924, totaled $29,442. Estimated net income for the first three-quarters of 1924 is thus brought up to $2,811,135 net.

The third quarter showing results from the reduced operations during July, August and September. Earnings were equivalent to 13 cents per share on the preferred stock, against $9.81 in the first quarter and $2.61 in the second quarter. It is believed a better showing will be made in the current quarter.

Bank indebtedness was wiped out earlier in the year and at the end of the third quarter the company had $10,000,000 cash on hand, according to local bankers close to company affairs.

GOODRICH PRODUCTION GAINS

AKRON, Nov. 19—The B. F. Goodrich Co. reports a considerable picking up in its business this month. The schedule has been increased by nearly 1000 tires a day, bringing daily production near to 23,000 tires.

Three Body Producers Form Big Merger

New Company Has Large Resources

Wilson, Widman and Towson Organizations in the Combination

DETROIT, Nov. 19—Formation of a new body corporation through the combination of the Wilson, Widman and Towson companies will be formally announced within the next few days, the new organization to combine the manufacturing and financial resources of these three with an approximate capitalization of $12,000,000 to $15,000,000.

The company is expected to be named the Murray Body Corp. through the participation of J. W. Murray and J. R. Murray of the J. W. Murray Manufacturing Co., although it has not definitely been indicated that the Murray company will be included in the merger.

The Murray company, however, either as a member company or a related company will supply the stampings for the body company.

The personnel of the company is as yet not complete, nor are the general details pertaining to the exchange of stock of the participating companies. There is a probability that J. W. Murray will be named chairman of the board, other officers to be named from the officers of the present independent companies. Several officers of the Wilson and Towson companies, it is declared, will retire from active participation in the industry.

An Economic Move

Among the car companies which these companies have been supplying with bodies are Paige-Jewett, Willys-Overland, Marmon, Packard, Lincoln and several of the Durant car divisions.

The merger is dictated purely by economic considerations within the industry. There is at present a large amount of excess capacity in the body field, and competition for business has been keen. Independent companies have found it difficult to hold business in the face of competition from the larger manufacturers, particularly in the Detroit district.

Within the recent past there have been several instances of business lost by independent body builders to the big companies, and it has been increasingly evident that only through combination could the smaller companies remain in business profitably.

Probably the outstanding reason for the excess of capacity in the body plants is found in the fact that many car builders within the last 18 months have built body plants of their own, which are now meeting their requirements. Practically all of the General Motors car divisions now have body plants operated by Fisher connected with their car manufacturing plants. Formerly this business was taken care of by the Detroit Fisher plants.

There is also excess capacity in the Briggs Manufacturing Co., one of the largest producers, although this company has concentrated its manufacturing activities in the past to two car companies, Ford and Hudson. Briggs makes all the Ford coupe bodies and all the Hudson Essex coach bodies. It also manufactured for several years the Ford sedan bodies, which are now being manufactured entirely by the Ford company itself.

Chrysler Sees Prices and Business Steady

NEW YORK, Nov. 19—"In my opinion," says Walter P. Chrysler, president and chairman of the board of directors of the Maxwell and Chrysler companies, in a statement issued today, "business for the year 1925 will be very satisfactory, and, as far as the motor car industry is concerned in the face of the rising material market, prices of cars cannot be lower."

Continuing, he says:

The automotive industry is moving cautiously. Young industry that it is, it has made mistakes, and wise that it is, too, it is profiting by its mistakes. The industry, like other industries, has overproduced. That will be guarded against in the future. The industry has seen the folly of indiscriminate price cutting, which was not based upon scientific estimates of costs and reasonable profits. It has learned that a policy which requires dealers to take more cars than they can sell is unwise.

Boston & Maine Forms Auxiliary Bus Company

BOSTON, Nov. 19—With an authorized capital of $100,000 and a charter permitting it to operate and own motor buses for transporting passengers and motor trucks for carrying freight, the Boston & Maine Transportation Co. has been organized here.

In making a statement about the purposes of the organization President J. H. Hustis said:

The new company will operate in conjunction with the Boston & Maine railroad. There is no intention of running buses or trucks in competition with steam trains. We believe there is a legitimate field for buses and trucks as an auxiliary to steam service on some of our lines and in place of steam service on other lines.

LAVENE BUYS PARTS BUSINESS

PHILADELPHIA, Nov. 19—Lavene Motor Co. has purchased the parts and service business of the Signal Motor Truck Co. of Detroit and has moved the business to its plant in Philadelphia.

Wm. A. Fisher Heads Fisher Body Corp.

Fred J., Charles T. and Lawrence P. Fisher to Devote More Time to G. M. C.

NEW YORK, Nov. 19—At a special meeting of the board of directors of the Fisher Body Corp., Fred J. Fisher, Charles T. Fisher and Lawrence P. Fisher resigned as directors of the corporation.

William A. Fisher was elected president and Edward F. Fisher and Alfred J. Fisher were elected vice-presidents. To fill the vacancies on the board, H. J. Eckenrode, president of the National Plate Glass Co.; Paul W. Seiler, president of the Ternstedt Manufacturing Co., subsidiary of the Fisher Body Corp., and Clarence R. Bitting, assistant to the president of the Fisher Body Corp., were elected directors.

As now constituted the officers of Fisher Body are: President, W. A. Fisher; vice-president, E. F. Fisher; vice-president, A. J. Fisher; treasurer and chairman of the board, Louis Mendelssohn, and secretary, A. Mendelson.

Following the meeting Fred J. Fisher stated that Lawrence P. Fisher, Charles T. Fisher and himself had been requested by General Motors to devote the greater part of their time to that company. Charles T. Fisher, however, will take an active part in the management of the Fisher Body Corp.

Mr. Fisher stated that the move was in no way indicative of any change in his or his brothers' interests in Fisher Body, their stock holdings being retained.

Fred J. Fisher has been a member of the board of directors and Executive Committee of General Motors and recently was elected to the Finance Committee. Charles T. Fisher and Lawrence P. Fisher are members of the board of directors and Executive Committee of General Motors.

Jennings to Represent Dodge Car in New York

DETROIT, Nov. 19—C. H. Jennings, assistant general sales manager of Dodge Brothers, is resigning this position, effective Nov. 30, to become Dodge Brothers dealer in the New York territory. He will be succeeded at the factory by P. L. Sanford, formerly director of distribution.

Mr. Jennings has been in the automobile business 20 years. In 1914 he became identified with Dodge Brothers as the New York district representative and in 1916 was brought to the factory as director of service. He was made assistant general sales manager in 1920.

Financing Companies Form National Body

Association Launched at Pittsburgh by 30 Executives from All Over Country

PITTSBURGH, PA., Nov. 19—The National Association of Automobile Financing Companies was formed at a meeting here of 30 executives of motor finance organizations from all sections of the United States. By-laws were adopted and several other important matters were disposed of, but election of officers was left for a meeting to be held in Chicago, Dec. 10.

The new organization has as its chief object, according to the by-laws, the unification of the interests concerned for educational, correctional, legislative, productive and other purposes generally cooperative.

The combined organizations represented in the new association have a capital of $29,110,000 and do an annual business of $217,955,000. The adoption of the constitution and by-laws and a general discussion as to the most practicable plans for augmenting the activities of the association consumed the entire time of the session.

The movement looking to the launching of a national association among representatives of the industry was said to have been sponsored by the Motor Finance Credit Association of Pittsburgh. The members of the organization committee of the new body, all active in the affairs of the local credit association are A. A. Ross and E. Arch Cohen of the Underwriters Syndicate of Pennsylvania, S. B. Evans and W. E. Biessecker.

Opening Address by E. A. Cohen

In his opening address as temporary chairman Mr. Cohen, explained the aims and purposes of the association to be formed and declared that "the activities shall be directed toward the promotion of sound banking practices, elimination of adverse criticism, protection of capital investment and to cement a fraternity with evidence of good will and fellowship."

The visiting members were the guests of the local committee at a dinner in the Union Club. John Mellor was toastmaster and addresses were made by Ralph H. Riddleberger of New York, H. W. Ritter of Cleveland, Jacob Gross of New York, M. S. Cohn of Indianapolis and Mr. Ross.

Goodyear and Fisk Bought Fabric Mills for Cash

NEW BEDFORD, MASS., Nov. 19—Myron C. Taylor, chairman of the American Cotton Fabric Corp., has confirmed the sale of the mills in Fall River, Mass., to the Firestone Tire & Rubber Co. and the plant in New Bedford, Mass., to the Fisk Tire Co. and Goodyear Tire & Rubber Co. All sales were made for cash.

It is understood that the property sold to Goodyear and Fisk will not be operated as a single unit controlled jointly by the two companies, but will be split as nearly in half as possible and that each plant will be operated independently of the other, although it will manufacture both square woven and cord tire fabric. The present operating organization probably will be retained in its entirety.

C. F. Broughton, treasurer of the Wamsutta mils and vice-president of the Ninigret mills, a subsidiary of the Fisk organization, is acting temporarily as the local representative of the purchasers.

Dodge Assembly Plant Obtained in Canada

TORONTO, ONT., Nov. 19—Dodge Brothers, Ltd. (Canada), has completed negotiations for the leasing with an option of purchasing of the Dufferin Street property, formerly the Canadian aeroplane factory. It is planned to establish an assembly plant to be devoted largely to export business. The buildings have a value of $627,000.

The Imperial government erected the buildings at a cost of $1,250,000, while the Columbia Phonograph Co. during its occupancy spent at least $500,000. The latter acquired the property shortly after the war, but sold it later to the American Canadian Properties Corp. of New York.

Dodge Brothers will prepare for immediate operation with a large staff.

Willys-Overland Starts Shipping Over Own Road

TOLEDO, Nov. 19—The Willys-Overland Co. has begun shipment of freight over its new railroad, the Toledo & Western traction line, which, in partnership with the Wabash, it purchased several months ago.

Although the company was unable to put through grade crossings in the city and enter its plant directly. new loading houses have been constructed at the edge of the city and improvements made in the Wabash connections at Adrian and Franklin Junction.

The electric line forms a "Y" with branches for east and west business, dividing after it leaves this city and connection with the Wabash twice.

Maibohm Organizes New Radio Company

SANDUSKY, OHIO, Nov. 19—H. C. Maibohm, former president of the Maibohm Motors Co., has organized the Simplex Radio Co. for the manufacture of a new type of radio receiving set. The company is capitalized at $1,000,000, all of which has been paid in, the major portion going to stockholders of the Maibohm Motors Co.

Goodyear Considers Refinancing Plans

Discusses with Bankers Refunding of Bonds at a Rate to Save $1,000,000 a Year

NEW YORK, Nov. 19—Plans for the refunding, at a lower coupon rate, of nearly $50,000,000 of bonds and possibly the retirement of $15,000,000 of outstanding accumulative prior preference stock are being worked out by officials of the Goodyear Tire & Rubber Co. with their bankers, Dillon, Read & Co. Completion of the plans is not expected until early in 1925.

With the tire and rubber industry in a more prosperous condition and with rates of interest much lower than when these issues were first floated, the time was considered favorable for the undertaking. Introduction of the balloon automobile tire, causing a desire of owners to change to this style before their old ones wear out, has resulted in increased sales on the part of this company, as well as of other tire and rubber companies.

Plans considered provide for the refunding of the two 8 per cent bond issues through the sale of a $50,000,000 issue of bonds bearing a coupon rate of 2 per cent less. As of May 1, 1924, there were outstanding $25,500,000 of the first sinking fund 8s and $23,500,000 of 8 per cent sinking fund gold debentures. The first issue, which matures May 1, 1941, is callable at 120, while the debentures, which mature May 1, 1931, are callable at 110. The prior preference, which might figure in the plan, although not now likely, is callable at 110.

By refunding the bonds the company would save $1,000,000 a year, at the same time lessening the amount of $3,000,000 a year necessary to meet sinking fund provisions.

Canadian Assets Gain

TORONTO, ONT., Nov. 19—In its statement for the year ended Sept. 30, 1924, the Goodyear Tire & Rubber Co. of Canada, Ltd., shows gross profits before providing for depreciation, but after taxes, of $1,275,378, as against $1,522,361 in 1923. Net after depreciation totaled $837,734, compared with $1,032,334 in 1923. After dividend payments of $600,738 surplus for the year was $236,996.

The balance sheet shows a general improvement in the liquid position. Current liabilities have been reduced from $941,039 to $776,116 and quick assets increased from $5,273,689 to $5,651,776. Working capital was increased from $4,332,650 to $4,876,661.

Profits for the year were equal to 16.86 per cent on the preferred.

Total assets at $13,106,054 compare with $12,679,480 and fixed assets at $7,414,777, against $7,371,135 last year.

3,500 Attend A. E. A. Convention and Show

Credit Bureau Among Important Questions Considered—Chicago Again Selected

CHICAGO, Nov. 19—The ninth annual convention and sixth annual show of the Automobile Equipment Association in Chicago marked a year of that organization's most notable progress. With more than 3500 members and guests registered during the show, the event took on an even greater importance than in the past.

During the week's convention sessions the association decided the following important questions:

Affirmed its sanction of the shows in New York, Chicago, Boston and Montreal, and of the National Hardware Association. By almost unanimous vote it refused sanction to any other exhibition.

Unanimously voted to elect directors in the future under a zoning plan, by which members in the nine different zones will be enabled to nominate their choice and later vote upon the nominations, using the Australian ballot system for each proceedure.

Voted to have a committee appointed to inquire into the desirability of establishing an association credit bureau of real effectiveness for the benefit of the members, that members may secure this information which they now have to look elsewhere.

Gave unanimous approval of the merchandising committee's plans for a still greater effectiveness in promoting the merchandising of replacement parts by jobber members. The committee has outlined a very effective campaign of analysis and research that will give the members great help in furthering their business in this department.

Authorized the employment of the Harvard Bureau of Business Research to conduct a second survey of the jobber's cost of doing business.

Officers and Directors

Officers for the ensuing year were elected as follows:

President, W. T. Morris, American Chain Co., Bridgeport, Conn.

Vice-President, N. F. Ozburn, Ozburn-Abston & Co., Memphis, Tenn.

Directors: J. W. Perry, Johns-Manville Co., New York; M. S. Gooderham, Toronto Auto Accessories Co., Ltd., Toronto, Canada; W. G. Pancoast, Biflex Products Co., Waukegan, Ill.; Arthur C. Storz, Storz-Western Auto Supply Co., Omaha, Neb.; L. A. Safford, McQuay-Norris Mfg. Co., St. Louis, Mo.; T. M. Williams, Peaslee-Gaulbert Co., Louisville, Ky.; P. D. Parker, General Electric Co., Harrison, N. J.

The president and vice-president are ex-officio members of the board.

Many Sales Made

The show was one of the best expositions ever sponsored by the association. Considerable new equipment was shown and radio for the first time was really very much in evidence. Most manufacturers reported sales at the show as excellent, and many new manufacturer-jobber alliances were made during the week. There was also evident a tendency on the part of manufacturers to make a more careful selection of their jobber outlets than in the past.

Montreal was selected as the meeting place for the summer convention of the association in 1926. Next summer's convention will be held at the Broadmoor Hotel, Colorado Springs, the week of June 22-27. The next show and convention will be held in Chicago the week of Nov. 8, 1925.

NEW YORK FOREIGN TAX LEVY UPHELD

WASHINGTON, Nov. 19—The United States Supreme Court has upheld the constitutionality of Article 9-A of the tax law of New York, providing for an annual franchise levy on foreign corporations doing business within the State.

In sustaining the validity of the law the court affirmed a decision of the Circuit Court of Appeals for the Second Circuit. The tax is assessed at the rate of 3 per cent per annum upon the net income of the corporation in the State for the preceding year.

Petroleum Institute to Discuss Motor Fuel

NEW YORK, Nov. 19—Motor fuel and motor lubrication will form the general topic of discussion at one group session of the American Petroleum Institute, which will hold its fifth annual meeting at Fort Worth, Texas, Dec. 9-10-11. This group session will be held on the morning of Dec. 11.

The subjects to be taken up are as follows:

"Report on motor fuel investigation," H. K. Griffin, United States Bureau of Standards.

"A new method for crankcase dilution," Mr. Griffin.

"Lubrication of the automobile engine," speaker to be announced.

"Utilization of motor fuel from the standpoint of the automotive engineer," speaker to be announced.

Studebaker Shows Gain in Its October Sales

SOUTH BEND, IND., Nov. 19—Studebaker sales in October were 15,099 cars, according to a statement of A. R. Erskine, president of the Studebaker Corp. This compares with 8,977 in October of last year and 6,926 in October of 1922.

"March and May, 1923," Mr. Erskine says, "are the only two months of the corporation's history in which sales exceeded those of this October. November sales promise an increase of 50 per cent over any previous November of record and December results will probably be greater."

State Laws Urged for Traffic Figures

Regulations for Pedestrians Also to Be Recommended to Washington Safety Conference

WASHINGTON, Nov. 19—The adoption of uniform State laws in the collection of traffic accident statistics will be the major recommendation of the committee on statistics at the conference on street and highway safety here Dec. 15, 16 and 17.

Another conclusion which the committee has reached is that the ratio of automobile accidents is so high and growing so fast that the State and Federal governments "should authorize large expenditures toward street and highway accident prevention measures."

Another premise reached, based on its statistics, is that public authorities must more stringently regulate pedestrian traffic. For the first seven months of this year 1390 fatalities were reported to the National Automobile Chamber of Commerce by 200 newspapers.

System Lacking

The committee found that there is almost a total lack of systematic effort to secure accurate and complete data regarding traffic accidents, and recommends that this be remedied by uniform laws requiring a report on all accidents.

The major recommendations which the committee will make in its report to the conference next month are as follows:

(a) That it should be made obligatory, by law, for those concerned to report all traffic accidents and an adequate penalty for failure to report should be provided.

(b) That there should be a uniformity in the reports and that some competent body should undertake the compilation of standard definitions of terms.

(c) That reports should show (1) where due to recklessness, carelessness or incapacity of persons: (2) fault of mechanism of vehicle; (3) physical conditions of the locality where the accident occurred.

Problem a Growing One

In its final summing up the report will say:

Not only is the problem a grave one, but it is growing. The total number of motor vehicle fatalities—automobiles and motorcycles combined—increased 20 per cent between 1922 and 1923. Whatever the basis of calculation, whether it be in terms of 22,600 fatalities of $600,000,000 annual loss, the economic loss due to street and highway traffic accidents has become so great that it warrants large expenditures toward their prevention.

DETROIT EMPLOYMENT GAINS

DETROIT, Nov. 19—The Employers' Association reports that industrial employment here last week declined 224, compared with a decrease of 596 the week previous, bringing the total to 194,025, a new low mark for the year. This is 48,825 below the peak of February.

Tire Dealers Seek Closer Cooperation

Wish to Cement Business Relationships Existing with the Manufacturer

AKRON, Nov. 19—Nearly 1500 tire dealers were here this week for the three day session of the National Tire Dealers Association. This was the fifth annual convention held by the association and was the most successful in the history of the organization, according to George J. Burger, president.

A movement was started at the convention to put the tire and accessory dealer on a definite merchant basis. This is essential to the industry, Mr. Burger said. "We want to define the term 'tire dealer' and get in closer touch with the producers," he added in advocating closer business relationship and cooperation between manufacturer and dealer.

Balloon tires came up for considerable discussion in the convention sessions. Most dealers reported considerable improvement in balloon tire business.

A new classification for tire dealers was recommended during the sessions. Under the plan the dealers would be divided into four classes.

Dealers in Class "AA" would furnish a financial statement of their business, would carry adequate stock and render service at all times to customers and would represent one factory 100 per cent.

Those in Class "A" would represent two companies and those in Class "B," any or all manufacturers.

Class "C" would include garages and all gasoline service stations. This class and corporations buying from manufacturers would be required to pay 5 per cent more for tires than regular tire merchants.

It was recommended that the "AA" dealer be given a 10 per cent discount in return for his greater service to the manufacturer.

New Dump Body Chassis Brought Out by Grahams

DETROIT, Nov. 19—Graham Brothers has brought out a new 124 in. wheelbase chassis designed for use with dump bodies, with 34 x 5 in. front, 36 x 6 in. pneumatic tires rear on wood wheels. The price is $1,400. A special road builders' model is also offered at $1,470 with 30 x 5 front and 34 x 7 in. pneumatic tires rear on steel spoke wheels.

Flat gravity, hopper gravity and hydraulic hoist types of dump bodies can be had with this chassis.

WINTON MUST PAY $100,000

CLEVELAND, Nov. 19—The Winton Co. has been directed by the Court of Common Pleas here to pay into the county treasury $100,000, due on delinquent personal property taxes.

County Treasurer McBride instituted suit to collect $255,000 in delinquent taxes and penalties. The company in its answer admitted a liability of $78,000.

The Winton Co. is manufacturing only marine engines.

Business in Brief

Written exclusively for AUTOMOTIVE INDUSTRIES *by the Guaranty Trust Co., second largest bank in America.*

NEW YORK, Nov. 19—Speculative activity continued at a high level throughout last week. Sales on the New York Stock Exchange reached a total of 11,527,132 shares, comparing with 8,058,070 in the preceding week and 5,082,639 in the corresponding period last year. General commodity prices also turned upward, wheat reaching new high levels for the year and iron and steel showing a distinct rise. Warm weather continued to check trade in seasonal lines, but was beneficial to the crops.

A shortage in the world's bread grain crops this year of 574,000,000 bushels is forecast by the Commissioner of the International Institute of Agriculture. The principal features of the situation are small crops in Europe and Canada.

A general gain in production and trade in October was reported by the Department of Commerce. Among the lines showing increases in activity are cotton ginnings, steel ingot production, zinc production, building, steel bookings, production and shipments of Portland cement, bank debits to individual accounts, sales of mail-order houses and new issues of corporate securities.

Car loadings in the week ended Nov. 1 numbered 1,073,430, comparing with 1,112,345 in the preceding week and 1,035,349 in the corresponding period last year. Although the latest figure shows a seasonal decline from the previous high records, it is the largest total ever reported for the last week of October. Freight traffic in September, as measured in net ton miles, was 1.1 per cent less than in September last year. Western roads reported an increase, while eastern and southern roads showed declines.

Production of crude petroleum in the week ended Nov. 8 averaged 1,928,800 barrels a day, which compares with a daily average of 1,944,100 barrels in the preceding week and 2,238,750 in the corresponding period a year ago. The rate of output has declined continuously since the middle of September.

U. S. Policy on Trade Associations Asked

Chamber of Commerce Recommends Its Legislative Program to President Coolidge

WASHINGTON, Nov. 19—Declaration of a policy regarding trade associations is recommended in the legislative program of the Chamber of Commerce of the United States as presented to President Coolidge. The Chamber regards that such associations, legitimately conducted, are an essential in the promotion of American business and that legislation which would make them impossible to prevent them from functioning properly would hinder not only industry, but also the prosperity of the nation.

The Chamber offers the following recommendations, as voiced by its membership, regarding the use of statistics by trade associations:

Statistics of capacity, production, stock and gains, and statistics of actual prices in closed transactions should be collected by a trade association for its industry or branch of commerce.

Such statistics should be distributed without any comment or interpretation which could induce or facilitate concerted action on the part of members.

The statistics should be made as available by a trade association to the public and government agencies as to the members of the Association.

Referring to these recommendations, the Chamber says:

It is the duty of the Chamber's board of directors to advocate the carrying into effect of these recommendations. In so doing it has to consider, not its own opinion of the legality of the activities which are included, but the attitude of the government and its officials who have relations to the question.

If it is forced to a conclusion that the view is held in government circles there is illegality in activities the Chamber's members have declared are desirable, it must consider seeking from Congress such minor amendments as will affirmatively permit the activities it advocates. Parenthetically, it may be added that obviously the Chamber does not seek repeal of the Sherman Law.

Automobile Financial Firm in Receivership

NEWARK, N. J., Nov. 18—Federal Judge Runyon has appointed William L. Dill receiver for the Automobile Financial Corp. of this city and has restrained the Creditmen's Adjustment & Interchange Bureau, which is said to hold assets of the Financial corporation, from disposing of any of its property pending a hearing. Petitioning creditors are the Keystone United Corp., the Credit Discount Trust Co. and Irving R. Waite, of the Commonwealth Bank of New York.

The company was incorporated in July, 1920, with capital stock of $1,000,000, of which $125,000 was paid in at the time business began.

Men of the Industry and What They Are Doing

Daniels Succeeds Jackson

Edwin B. Jackson has resigned as vice-president and general manager of the Locomobile Co. of America, Inc., a subsidiary of Durant Motors, Inc., and has been succeeded by George E. Daniels. Prior to going with Durant Motors, Mr. Jackson was vice-president of the Willys-Overland Co. at Toledo and previously was president of the Packard Motor Car Co. of New York. Mr. Jackson has made no announcement of his future plans.

Dingley Marmon Service Manager

Bert Dingley has been appointed service manager of the Nordyke & Marmon Co. He had been identified with the Marmon organization for several years, but for the last six months has been district sales manager with the Franklin Automobile Co. Mr. Dingley was formerly a racing driver and joined Marmon in 1919 as district sales representative on the Pacific Coast. In 1920 he became identified with the production department of the company in the inspection end. Mr. Dingley succeeds L. C. Voyles, who has been transferred to the sales department in the place of C. A. Campbell, who becomes district sales representative in the southern States.

Barnes with Martin-Parry

Claire L. Barnes has been appointed assistant to the president of the Martin-Parry Corp. and also vice-president of the Oakes Co. of Indianapolis, a division of the Martin-Parry corporation. Mr. Barnes was secretary of the Detroit Steel Products Co. at one time and later was assistant to John N. Willys, president of the Willys-Overland Co. In recent years he has been engaged in financial reorganization matters in connection with industrial corporations and other work of a similar character. His duties will be of a general executive character in connection with the operations of the Martin-Parry Corp.

Petty Joins International

Walter M. Petty has severed his connection as chief engineer of Service Motors, Inc., Wabash, Ind., to become associated with the International Motor Co., Allentown, Pa., as assistant engineer of its railcar division.

Additions to Cadillac Force

Two members have been added to the sales department of the Cadillac Motor Car Co. to increase the organization activity in the field. They are E. Phil Merrill, for 13 years in charge of Cadillac education work, who returns after an absence of three years, and Henry H. Batcheller, for some time sales manager for a Boston distributor.

In addition to his former work of presenting the Cadillac car to audiences at automobile shows, sales and exhibits, Mr. Merrill is undertaking cooperative work with Cadillac salesmen throughout the country. The purpose of this is to develop distinctive methods of presenting the car to individual prospects.

Mr. Batcheller will act as the company's representative among distributors and dealers, assisting in the application of business administration methods.

Elmendorf Rejoins Haskelite

Armin Elmendorf, formerly chief engineer for the Haskelite Manufacturingfi Corp., Chicago, has rejoined that organization. For the last two years Mr. Elmendorf has been in Europe investigating new developments in the construction of railway coaches, street cars and omnibuses.

A. O. Roberts with Velie Motors

Arthur O. Roberts of Detroit has been appointed assistant advertising manager of the Velie Motors Corp. He was formerly identified with the sales promotion and advertising departments of the Maxwell-Chrysler organization.

J. C. Ferguson Returns

J. C. Ferguson, general manager of the Eclipse Machine Co., Elmira, N. Y., has returned from a European trip.

Travis Goes with Marmon

E. A. Travis, for a number of years identified with the automotive industry, has been appointed vice-president and general manager of the Marmon Automobile Co. of New York to succeed Sam S. Toback, resigned.

Mr. Travis was sales manager of the Locomobile Co. at one time and later was assistant to W. C. Durant of Durant Motors. In February, 1922, he was appointed auxiliary receiver for the Locomobile company.

Norris a Strom Manager

Alfred G. Norris has been appointed manager of the New England office of the Strom Ball Bearing Manufacturing Co., with offices in Hartford, Conn. Mr. Norris has been identified with the ball bearing industry for a number of years and is well known among industrial engineers and manufacturers in the New England States. A. W. Wiese, sales engineer of the company, has been transferred from the Philadelphia office to the new office in Hartford.

Johnson Directs Charity Drive

Herbert F. Johnson, president, S. C. Johnson & Son Co. of Racine, Wis., manufacturer of automobile waxes, finishes, varnishes, etc., served as chairman of the executive committee in charge of the annual campaign of the Racine Community Fund, Nov. 10 to 14.

Taxicab Owners Hear Mobilization Talk

Army Officer Discusses Provisional Emergency Force at Semi-Annual Meeting

CHICAGO, Nov. 15—Major General A. C. Dalton, director of the Motor Transport Division of the United States Army, before the semi-annual meeting of the National Association of Taxicab Owners at Hotel Sherman, Chicago, outlined a plan to organize a provisional emergency force composed of the nation's motor transport facilities. As the first step in this movement, it is intended to institute a provisional organization of commercially operated taxicab drivers, the drivers to be grouped into companies. In each, under army standards, there will be 64 men and three officers. These men and their cars would be subject to any emergency requisition from the War Department.

The taxicab branch, in fact, under the government's preparedness plan, would be the "minute man" factor. In event of an extreme eventuality the taxicab drivers and their cars, drilled for the purpose, would be swung into action overnight to care for the exceptional transport demand until the War Department could muster substitute equipment.

Railroads Inadequate

Major Geeral Dalton pointed out that with all rail lines operating at such a time at maximum capacity their facilities would not be adequate in a time of conflict within the nation's borders.

In the taxicab organization, Major General Dalton stated, the head of the largest operating taxicab company of a district would be designated as an officer with the title of Director of Highways in his own Army Corps area. Motor transport centers would be established in each of the larger cities with subcenters at the junctions of principal highways.

In a review of the growth of the taxicab and motor bus business it was revealed that there now are about 50,000 taxicabs in use in this country and about 3000 motor buses.

John J. Boobar of Washington, president of the organization, presided.

OLDSMOBILE OUTPUT GAINS

LANSING, MICH., Nov. 19—Oldsmobile for the ten months of 1924 shows a gain of 15,000 cars, or 62 per cent, over the same period of last year. Production schedules for November and December call for 5000 of the new coach model.

Proposed Rate Raise Opposed by Shippers

Automobile Men and Carrier Representatives Show a Disposition to Agree

CHICAGO, Nov. 19—Representatives of carriers in Central Freight Association, Eastern Trunk Association and New England Association territories conferred with shippers of these districts in this city upon the proposal for a revision of class rates between points in the C. F. A. territory and east of Buffalo and Pittsburgh.

On the shippers side of the discussion were K. A. Moore, assistant traffic manager of the National Automobile Chamber of Commerce; H. Denster, traffic manager of the Motor and Accessories Manufacturers' Association, and traffic experts of a number of the larger automobile and automotive producing companies. The automotive industry was well represented along with various other interests, the proposed advance being of a general nature.

The new tariffs as suggested by the carriers would advance class rates on the Chicago-New York base, from 12½ cents to 19 cents in classes from 1 to 4 inclusive, leaving Class 5 unchanged and reducing Class 6 rates 2½ cents. On the Chicago-New York base, Class 1 would be advanced 19 cents; Class 2 12½ cents, Class 3, 13½ cents and Class 4, 14½ cents.

Not Justified by Conditions

Opposition to this revision by the shippers was based on the ground that it would not be justified by existing conditions and the conference resulted in an agreement to hold further conferences later on in the east. Meanwhile an effort will be made to supply all interested shippers with copies of a pamphlet which sets forth the contentions advanced at the Chicago gathering.

The meeting here was entirely harmonious and suggested a disposition on the part of both sides to effect an amicable adjustment.

Whatever decision is ultimately reached will be submitted to the Interstate Commerce Commission, which possibly will assign hearings in January or February.

While the proposed advance is described by traffic managers as a revision of far-reaching significance, the revision's operation is a matter which it would be impossible to bring about in the immediate future.

Seek Better Railroad Cars

NEW YORK, Nov. 19—A committee of traffic managers, members of the National Automobile Chamber of Commerce, has arranged a series of conferences with Eastern railroad executives this week at New York and Philadelphia to discuss certain features of car building to meet the needs of the industry. Among these features is the question of maintaining an adequate supply of end-door box cars, the number of which has been decreasing. Members of the committee are John J. Delaney (American La France), S. L. Harter (Mack), F. C. Hickey (Pierce-Arrow) and A. J. Henderson (White).

The next meeting of traffic managers will be held in Detroit early in December, according to J. S. Marvin, chairman of the conference, the actual date to be announced later.

Buda Co. Producing New Six-Cylinder Bus Engine

HARVEY, ILL., Nov. 19—The Buda Co. is now in production on a new six-cylinder L head bus engine with 4-in. bore and 5 1/8-in. stroke. The cylinder block and the detachable head are gray iron castings. The crankcase is an aluminum casting and extends 3½-in. below the axis of the crankshaft. The oilpan is also of aluminum. Four main bearings support the crankshaft, all 2½-in. in diameter.

The front and first and second intermediate bearings are 2 1/8-in. long and the rear bearing 3½-in. in length. Crankpins are 2½-in. in diameter and 2 1/8-in. in length. The camshaft is carried in three bearings and operates the valves through mushroom type tappets. Intake valves are 1⅞-in. in the clear and exhaust valves 1¾-in.

The intake manifold is of the rectangular section high turbulent type. Pressure lubrication is provided at the main connection rod and camshaft bearings by a gear oil pump by helical gears from the camshaft. Cooling water is circulated by centrifugal pump.

Provision is made for starting and lighting equipment and for either battery or magneto ignition. The weight of the engine is 767 lb. without accessories.

Buick Brings Out Two Five-Passenger Models

DETROIT, Nov. 19—Buick has brought out two five-passenger coach models on the master and standard chassis priced respectively at $1,495 and $1,295. The former model is finished in cobalt blue below and black about the belt and the latter in brewster green with red striping and black superstructure. The finish is duco, which is now used on all Buick models.

The bodies are by Fisher and have the VV one-piece sliding windshield. Equipment includes sun visor, automatic windshield cleaner and rear mirror.

DE PALMA WINS RACE

SAN FRANCISCO, CAL., Nov. 19—Ralph De Palma, driving a Miller Special, won the 100-mile race on the one-mile dirt track at Tanforan Sunday in 1 hr. 42⅝ sec.

Market in Europe Ripe for U. S. Cars

M. L. Pulcher Says Low Costs Through Domestic Consumption Is the Key

DETROIT, Nov. 19—With the exception of France and Italy, the European market is wide open for American cars and trucks, says Martin L. Pulcher, president of Federal Motor Truck Co., who is just back after a visit to the London and Paris shows. He proved this by signing up a number of distributors at important points in several countries.

To get what he considers his share of the available business, Mr. Pulcher is planning to bring out several models which will meet especially the requirements of the European trade and which, at the same time, will find a considerable market in the United States among certain classes of delivery service.

These new models will be practically designed exclusively for export trade and yet there will be sufficient business for them in the United States to make large production and consequent low costs possible. The ability of the American manufacturer to get low costs through large domestic consumption is the key to the European trade situation. It enables American products, despite shipping costs and tariffs, to undersell the home product.

Light Vehicles in Demand

Mr. Pulcher brought back with him the ideas for the new models which he will build, getting these after studying the general habits and systems of the European tradespeople. Going to Europe he had rather definite plans as to how these models should be built and his conclusions were borne out by his investigations. As a result, he said, he expects to get an early start on production of these types.

The whole demand in Europe is practically for light vehicles, owing to fuel costs and horse power taxes, Mr. Pulcher says. There is little demand for trucks in excess of two tons, the weights in greatest favor ranging from below one ton to the two ton vehicle. Small power plants are essential to use in Europe, he says.

Europe Likes Gay Colors

Studying the field from the passenger car viewpoint, Mr. Pulcher says the obvious shortcoming is that American manufacturers are not giving their cars the colors or finishes that the European tastes seem to prefer. American cars at the London and Paris shows seemed drab in comparison to the highly finished and bedecked European vehicles.

In Mr. Pulcher's opinion the Paris show is much more important to the American exporter than the London show.

Tire Production Gain Shown in September

Rubber Association Analysis Notes Reduced Shipments—Balloon Casing Outfit Drops

NEW YORK, Nov. 19—Increased production and reduced shipments during September are shown in the tire statistics compiled by the Rubber Association of America. The exception is balloon casings, which show a drop in output.

In the following table, the high pressure inner tube figures represent reports of 51 companies, and the high pressure pneumatic castings (cord) of 56 companies:

HIGH PRESSURE INNER TUBES

1923	Inventory	Production	Shipments
Jan.	5,838,310	3,951,885	3,818,131
Feb.	6,771,958	4,039,202	3,063,883
March	7,740,945	4,875,414	3,910,562
April	8,394,184	4,259,558	3,618,495
May	9,292,223	4,317,537	3,488,394
June	8,924,326	3,590,011	3,661,527
July	7,527,281	2,666,354	4,030,253
Aug.	6,950,578	3,577,922	4,350,329
Sept.	6,457,455	3,254,575	3,724,724
Oct.	6,898,425	3,855,244	3,635,856
Nov.	6,693,639	3,451,716	3,453,083
Dec.	6,318,446	3,288,665	3,548,704
1924			
Jan.	6,720,247	3,887,959	3,542,500
Feb	7,339,307	4,067,631	3,397,668
March	8,054,331	4,062,046	3,412,372
April	8,373,523	3,745,870	3,429,394
May	8,296,177	3,276,660	3,435,021
June	7,476,962	3,057,152	3,705,059
July	5,925,924	3,545,956	5,084,015
Aug.	5,006,578	4,588,385	5,250,579
Sept.	5,153,778	5,039,594	4,823,039

BALLOON INNER TUBES

1924			
March	103,373	156,904	87,733
April	253,820	289,372	156,885
May	465,635	467,448	213,469
June	689,196	436,279	259,550
July	708,098	311,333	308,238
Aug.	751,732	427,302	369,335
Sept.	885,090	466,848	357,765

HIGH PRESSURE PNEUMATIC CASINGS—CORD

1923	Inventory	Production	Shipments
Jan.	2,484,528	1,608,889	1,546,859
Feb.	2,816,382	1,763,763	1,426,161
March	3,117,662	2,198,643	1,924,670
April	3,382,375	2,086,617	1,804,072
May	3,935,828	2,187,442	1,631,474
June	4,096,145	1,772,512	1,346,673
July	4,108,853	1,173,142	1,315,664
Aug.	4,026,140	1,389,703	1,532,419
Sept.	3,733,734	1,169,140	1,457,778
Oct.	3,442,061	1,318,837	1,588,932
Nov.	3,237,315	1,369,117	1,544,986
Dec.	2,934,772	1,450,957	1,686,758
1924			
Jan.	3,196,362	1,941,314	1,735,035
Feb.	3,465,830	2,075,459	1,849,069
March	3,727,331	2,027,844	1,822,292
April	3,782,881	1,878,529	1,836,147
May	3,727,795	1,650,366	1,649,812
June	3,567,635	1,530,872	1,683,898
July	3,028,785	1,632,380	2,148,581
Aug.	2,679,205	1,983,530	2,663,087
Sept.	2,731,376	2,077,359	1,959,306

BALLOON CASINGS

1924			
March	116,433	216,808	141,272
April	293,406	406,807	235,217
May	569,624	564,030	282,596
June	734,649	500,130	317,215
July	715,844	365,213	393,132
Aug.	765,002	501,166	435,572
Sept.	850,430	479,755	398,324

PNEUMATIC CASINGS—FABRIC

1923	Inventory	Production	Shipments
Jan.	2,211,440	1,518,381	1,538,814
Feb.	2,408,005	1,454,224	1,249,468
March	2,552,939	1,667,083	1,502,822
April	2,705,897	1,452,709	1,275,671
May	2,970,766	1,472,544	1,212,969
June	2,944,455	1,184,431	1,229,324
July	2,362,271	819,847	1,281,821
Aug.	2,032,247	966,212	1,319,615
Sept.	1,663,823	860,441	1,214,777
Oct.	1,434,291	1,042,503	1,276,975
Nov.	1,452,014	1,030,608	1,011,215
Dec.	1,394,528	986,191	973,570
1924			
Jan.	1,611,722	1,278,978	1,103,535
Feb.	1,799,303	1,203,215	1,017,557
March	1,919,320	1,183,040	1,027,338
April	2,087,939	1,022,142	942,077
May	2,033,774	824,190	837,562
June	1,853,253	598,740	752,030
July	1,393,845	554,736	1,019,397
Aug.	1,032,809	750,045	1,094,455
Sept.	942,599	973,764	1,046,609

SOLID AND CUSHION TIRES

1923			
Jan.	262,462	83,343	65,711
Feb.	270,191	75,457	67,084
March	265,843	79,788	82,405
April	260,631	71,468	76,204
May	268,323	77,288	71,114
June	283,425	72,445	56,170
July	263,891	42,345	49,126
Aug.	262,810	48,141	48,718
Sept.	249,379	37,074	49,667
Oct.	234,945	37,285	51,604
Nov.	213,686	32,577	53,178
Dec.	178,088	34,937	65,143
1924			
Jan.	182,782	53,604	47,295
Feb.	188,519	60,646	52,965
March	203,608	68,662	61,482
April	212,419	69,534	58,486
May	219,538	63,901	60,267
June	212,704	50,887	58,716
July	202,850	42,498	51,449
Aug.	183,159	52,516	60,684
Sept.	179,927	54,106	59,581

All Classes of Cars Increase in New York

NEW YORK, Nov. 19—An increase in registrations in all classes of cars during October as compared with the previous month is shown in the monthly sales analysis for the metropolitan district made by Sherlock & Arnold. Registrations of higher priced cars for the ten months of this year total 5,911, as compared with 7,349 in the corresponding period of 1923, and 6,246 in the ten months of 1922. In the low medium priced field registrations for the period aggregate 79,202, as against 72,184 in 1923 and 58,541 in 1922.

Recapitulation for the year and for the previous two years follows:

LOW AND MEDIUM PRICED CARS

	1924	1923	1922
Jan.	3,548	2,803	2,014
Feb.	3,814	2,775	2,230
Mar.	8,179	8,050	6,352
April	12,133	11,050	8,428
May	11,597	11,220	8,467
June	8,996	9,699	8,230
July	11,376	9,127	7,816
Aug.	7,870	6,458	5,921
Sept.	5,751	5,430	4,592
Oct.	5,938	5,572	4,518
	79,202	72,184	58,541

HIGHER PRICED CARS

Jan.	292	212	283
Feb.	357	606	273
Mar.	674	821	632
April	972	1,180	862
May	808	1,059	961
June	609	815	865
July	667	760	678
Aug.	478	542	516
Sept.	461	553	511
Oct.	593	801	665
	5,911	7,349	6,246

KENTUCKY TAX EFFECTIVE

LOUISVILLE, KY., Nov. 19—A tax on taxicabs in Kentucky has just become effective. All taxicab companies must pay a license of $2.50 for each seat.

33 American Exhibits at Argentine Show

Optimism Prevails with Many Prospects Booked—25 Lines of Trucks

BUENOS AIRES, ARGENTINA, Nov. 17 (*by Cable*)—A most optimistic outlook is being expressed by the automotive dealers and exhibitors at the Seventh Annual Automobile Show, which opened here Nov. 13 in the handsomely decorated and commodious Pabellon de las Rosas. Many prospects have been booked and a daily attendance of approximately 6,000 was averaged during the first days. The weather at the opening was somewhat cold, but, with interest extending, larger attendance was anticipated for the closing days of the exposition.

The 1925 models were generally on view, with about 100 companies having displays in the 157 booths provided by the Automovil Club Argentine, which managed and supervised the exhibition. In the exhibits 33 American producers of cars were represented, with 12 from Europe. Some 25 lines of trucks were shown, in addition to motorcycles, accessories, gasoline pumps, cycles, batteries, oil, gasoline and marine motors. Several lines of tires were also shown. The Argentine industry was represented by five body building companies, four making accessories, two upholstery and one radiators.

Quite a few cars not previously exhibited at one of the annual Argentine expositions were on view. Among them were the Elcar, Flint, Auburn, Paige, Jewett, Davis, Rollin, Rickenbacker, Chrysler, Gardner, Voisin, Minerva, Selve, Berliet, Delage and Spa.

The exhibition hall is beautifully decorated, with flowers and large paintings that fill up the large spaces. Sales have been promising. On the basis of orders booked and increased prospects, the commercial success of the show was early assured.

Among the particular exhibits attracting attention of visitors were those of Packard, near the main entrance, the body trimmings on the Dodge Brothers cars and the special booth of the Ford company. Ford has three exhibits, one in the main hall showing the Lincoln, another in the rear showing cars and trucks and the third outside, featuring the tractor, with various equipment and attachments.

FOR NEW YORK GASOLINE TAX

SYRACUSE, N. Y., Nov. 19—At its fourth annual meeting here, the New York State Automobile Bus Dealers Association decided to make another fight for a State gasoline tax and reduction of automobile license fees. It also will propose an additional tax of one cent a gallon between Nov. 1 and April 1, this to be used for removing snow.

French Market Slump Follows Paris Show

One Ray of Hope Is That Business Will Improve When German Market Opens

PARIS, Nov. 10 (*By Mail*)—A marked slump has shown itself on the French market since the closing of the show and several factories have laid off men. Three firms, among them two of the largest producers, have deferred payment for 30 days of bills falling due at the end of this month. There is a tendency for manufacturers to force the hands of dealers, many of whom have been informed that their allotment of cars has been increased 100 per cent for the year 1925.

The prospect of import duties being reestablished in England under the new Conservative government is not encouraging. There is a hope that business will be done with Germany as soon as that market opens up. One firm building a medium class car took an order during the show for 600 automobiles to be delivered into Germany as soon as imports are permitted.

Dealers hold the opinion that sales in Paris are likely to drop in the immediate future owing to garage shortage. At present there is an insufficient number of garages in Paris and in some cases rates are going up in consequence.

Parking, which has been unrestricted throughout Paris up to the present, is about to be limited in the busy quarters of the city, and there is a fear that these restrictions may adversely affect sales.

Motor and Tire Stocks Increase in Activity

NEW YORK, Nov. 19—Although not participating in the first general uprush on the New York Stock Exchange following the election, the automotive and tire stocks early this week began to show signs of real activity, indicating that greatly increased business next year is being anticipated. The stocks of the truck companies showed the largest gains, Mack Trucks, Inc., reaching a new high of 113½ on Tuesday, while White Motors went to 70⅛.

The advance in the latter stock is ascribed by some to a report that a stock dividend is to be declared. Maxwell Motors Class A stock Tuesday reached a new high for the year of 78 and the Class B stock 31¾. Studebaker has advanced to 42. Fisk Tire & Rubber reached a new high of 11¾.

SALE OF TRIPLE ASKED

KITTANNING, PA., Nov. 19—Charging that the Triple Airless Tire Co. has defaulted in the payment of interest on mortgage bonds, the Safe Deposit & Title Guaranty Co., trustee, has petitioned the court for an order directing the sale of the company's property and the distribution of the proceeds among the bondholders.

The mortgage was delivered to the Safe Deposit company June 17, 1921, to secure an issue of first mortgage serial 10 per cent bonds aggregating $100,000.

Highway Officials Talk of Uniform Traffic Laws

SAN FRANCISCO, Nov. 19—The tenth annual convention of the National Association of Highway Officials concluded its three-day meeting here today. The convention was said to be one of the largest in point of attendance in the history of the association, with engineers and highway officials from all over the United States present.

An illustration of highway problems of the West was presented by Howard C. Means, chief engineer of the highway commission of Utah, who read his paper on the famous Wendover Cutoff in Utah.

Other members who addressed the gathering were Thomas H. MacDonald, chief of the United States bureau of public roads, who spoke on the urgent need for uniform traffic laws and public safety devices, and A. H. Hinkle, superintendent of maintenance of Indiana, who called for proper marking on highways.

Lexington Announces Two Price Increases

CONNERSVILLE, IND., Nov. 19—Increases in price ranging from $100 on all "Concord" models, and from $45 to $200 on the "Minute Man" models of Lexington cars, have been announced by the Lexington Motor Car Company.

The old and new prices are given herewith:

	Old Price	New Price
"CONCORD"		
5-pass. Touring	$1,495	$1,595
5-pass. Touring Enc.	1,595	1,695
5-pass. Spec. Touring	1,695	1,795
5-pass. Sedan	2,085	2,185
"MINUTE MAN"		
2-pass. Roadster	2,045	2,145
5-pass. Touring	1,995	2,095
5-pass. Lark Touring	2,230	2,345
5-pass. Cal. Touring	2,295	2,495
7-pass. Touring	2,095	2,195
7-pass. Cal. Touring	2,395	2,495
5-pass. Royal Coach	2,450	2,495
5-pass. Brougham	2,530	2,595
5-pass. Sedan	2,830	2,895

A. M. A. at Dinner Hears Prosperity Prediction

CHICAGO, Nov. 19—At the annual dinner of the Automotive Manufacturers Association, which was one of the most successful affairs ever given by this organization, the speakers were Robert E. Crowe, State's Attorney of Cook County, on "Business and the Law"; C. H. Crennan, Economist of the Continental and Commercial Banks on "The Future Trend," and Harry L. Fogleman, a teacher of salesmanship, on "The Master Salesman."

Mr. Crennan gave a picture of the probable future trend of business. He drew the conclusion that a period of prosperity lies before American industry.

FINANCIAL NOTES

Paige Detroit Motor Car Co. for nine months ended Sept. 30 reports net profit of $2,417,293, after charges and taxes, equivalent after preferred dividends to $3.82 a share earned on 600,000 shares of common stock. After payment of preferred dividends of $125,005 and common dividends of $540,000 there is carried to surplus $1,752,288, making profit and loss surplus as of Sept. 30, $1,961,739. Sales for nine months total $34,457,706. In its balance sheet the company lists notes and accounts receivable at $1,232,140 and accounts payable of $1,753,956.

Stewart-Warner Speedometer Corp. earnings in the third quarter totaled $1.37 a share, as compared with $3.39 in the corresponding period of last year. The net for the nine months amounted to $5.61 a share, compared with $11.68 a share in the same period of 1923. Quarterly dividend checks of $1.25 a share accompanied the statement of earnings. The statement shows a decline of $559,773 in the net working capital and an increase of $667,493 in the good will and patent account. Total assets are put at $27,069,983.

Eaton Axle & Spring Co.'s consolidated balance sheet as of Sept. 30, 1924, shows current assets of $2,864,331, compared with $3,015,572 as of Dec. 31, 1923, and current liabilities on the former date of $841,423, as against $776,764 the last of December. Included in the current assets are: Cash, $140,872; accounts receivable, $660,396, and notes receivable of $259. Current liabilities include accounts payable of $247,694; notes payable, $450,000; customers' deposits, $20,000, and accruals of $123,728.

Martin-Parry Corp. reports net sales of $1,077,999 and net profit of $80,075, after all charges, for the quarter ended Sept. 30. This was equal to 80 cents a share on the 100,000 shares of no par value capital stock outstanding. For the nine months ended Sept. 30 the company reports net sales of $3,659,872 and net profit of $342,443. The net profit for the nine months was equal to $3.42 a share on the capital stock.

Reynolds Spring Co.'s comparative consolidated balance sheet as of Sept. 30 shows current assets of $2,460,133, compared with $1,118,778 as of Dec. 31, 1923. Current liabilities are listed at $258,424, as against $152,415. Included in the current assets are accounts and notes receivable of $470,774. Accounts payable, among the current liabilities, aggregate $87,465.

Moore Drop Forging Co. has called for redemption, at the First National Bank, Boston, Jan. 1, 1925, all outstanding 7 per cent serial gold notes due July 1, 1925, with accrued interest and a premium of ½ of 1 per cent. Payments may be had before Jan. 1, at the amount due that date, less a discount of 3 per cent per annum.

Motor Wheel Corp. for nine months ended Sept. 30 reports net earnings of $1,496,000 after taxes, an increase of $300,000 over the corresponding period of 1923. During the period the corporation retired $400,000 of its bonds and reduced its preferred stock to $1,700,000.

S. F. Bowser & Co. in its balance sheet of Sept. 30 reports total assets of $8,546,261. Cash is listed at $309,146 and accounts receivable at $2,425,603. Notes payable are shown at $132,000 and accounts payable and accruals at $316,427.

Packard Motor Car Co. has declared the regular quarterly dividend of 1¾ per cent on its preferred stock, payable Dec. 15, 1924, to stockholders of record Nov. 29, 1924.

Maxwell Motor Corp. comparative balance sheet as of Sept. 30, 1924, lists cash on that date of $5,138,562; B. L. drafts, $3,847,041, and accounts receivable of $861,987.

Vesta Battery Co. has declared the regular quarterly dividend of 1¾ per cent on the preferred stock, payable Dec. 1 to stock of record Nov. 20.

Omnibus Corp., Chicago, has declared the regular quarterly dividend of 2 per cent on preferred, payable Jan. 2 to stock of record Dec. 20.

J. G. Brill & Co. has declared the regular quarterly dividend of $1.25 on common stock payable Dec. 1 to stock of record Nov. 22.

CHRYSLER BUILDS 25,000TH SIX

DETROIT, Nov. 19—Chrysler Motor Corp. produced its 25,000th Chrysler Six on Oct. 29.

Toledo Is Prepared for Heavier Traffic

Railroads Increase Daily Yard Capacity by Expenditure of $5,987,000

TOLEDO, Nov. 19—Automotive manufacturers in the southern part of Michigan will find shipping conditions greatly improved this winter with the addition of railroad yard facilities at Toledo made possible by expenditure of more than $5,987,000 during the last year.

A survey of the Toledo yards shows a capacity for handling 52,263 cars daily, against a peak load in October of about 32,200 cars a day. This indicates that the Toledo yards can absorb a back-up equivalent of nearly 60 per cent of the peak movement.

In the past many plants in Michigan cities with inadequate facilities at their doors have been forced to suffer inconvenience when the cars jammed in Toledo yards.

The Michigan Central Railroad has built an entirely new northbound yard and the Pere Marquette has constructed a new terminal with storage and classification yards, roundhouses and transfer warehouses. Pennsylvania and New York Central lines have both enlarged their facilities. Improvements planned for the coming year will cost $1,442,400.

Motive power is also in good condition on the northbound roads out of Toledo. In many past winters lack of this has aided in congesting terminals.

L. G. Macomber, traffic commissioner of the Toledo Chamber of Commerce and chairman of the Great Lakes Regional Advisory Board, believes that his survey has shown a surplus of capacity at Toledo to insure favorable operations through any kind of a winter.

Body Company Making More Buses for Detroit

DETROIT, Nov. 19—American Motor Body Corp. is manufacturing 36 double deck six-wheel buses for the Detroit Motor Bus Co., all of which will be in operation on Detroit routes before the end of the year. The body corporation is assembling the chassis for the major part of the fleet, the first coming direct from the Six Wheel Co. of Philadelphia, whose design is followed in the manufacture. All body work will be done here, the operating company doing the final work in its own shops.

The Detroit Bus Co. has built several vehicles on the Philadelphia chassis, which it has had in experimental operation during the last few months. These are declared to have worked out successfully, the type of construction with pneumatic tires giving greater riding comfort and increased acceleration and better braking. As a result of this experimental operation it is now proceeding with its plan to use a considerable fleet of vehicles of this type.

The American Motor Body Corp. and the Six Wheel Co. are closely connected in a financial way. Both are included in the group of companies in which Schwab interests dominate. Up to this time the body corporation has been an exclusive manufacturer of passenger car bodies. Part of the plant, however, is now understood to be devoted to bus building for business in the Central West.

INDUSTRIAL NOTES

Charles S. Monson Organization, with offices in the Dime Bank Building, Detroit, has been appointed exclusive representative of the Standard Mirror Co. to manufacturers in the automotive industry. The company is producing a complete line of rear view mirrors for passenger cars, trucks and buses, as well as special decorative mirrors for de luxe types of buses and a complete line of windshield side wings.

Toppins Tractor Truck Co., an Illinois corporation, has been granted a Wisconsin charter with $300,000 capital stock. The company originally was formed in Wisconsin. It established a plant in Appleton, Wis., where operations are being planned on an extensive scale. W. R. Wheaton of Appleton is designated as Wisconsin agent of the foreign corporation.

Prescott Co-operative Manufacturing Co. of Prescott, Wis., has been granted a charter to manufacture a general line of automotive equipment, materials, parts and accessories. The capital stock is $100.000. The incorporators are George F. Mercord, Samuel McDonald and William H. Stark.

Commonwealth Motor Co. plant, Rockdale, Ill., has been sold for $25,000 to the Joliet Wrought Washer Co., recently burned out. Commonwealth Motor went out of business several years ago. Four factory buildings, including two of brick and concrete, with a total of 40,000 sq. ft., were included in the lot.

Compulsory Insurance Plan Before Governors

JACKSONVILLE, FLA., Nov. 18—The question of safety on the highway and compensation for the victims of automobile accidents was discussed at the sixteenth annual conference of Governors held in this city. During the discussion Governor Cox of Massachusetts outlined a bill, now being considered by the Legislature of that State, providing for compulsory liability insurance.

Under the bill registration of cars would be limited to applicants who have taken out a liability policy, with $5,000 and $10,000 limits for personal injuries or death and $1,000 for property damage, to those who have filed a bond executed by a surety company as security, or to those who have made a deposit with a State official of $6,000 cash or securities, out of which demands up to $5,000 for death or personal injuries and up to $1,000 for property damages would be satisfied.

The State Commissioner of Insurance under the proposed law would have broad administrative powers.

PACKARD REELECTS OFFICERS

DETROIT, Nov. 15—All officers and directors of Packard Motor Car Co. were reelected at the annual meeting held this week.

METAL MARKETS

As marked a change has come over the automotive steel market in the last few days as did over the Stock Exchange immediately following election. There has been noted in all the markets the first genuine buying movement in months. Purchases embraced all products from bolts and nuts and spring steel to bars, shapes, and sheets.

The gratifying feature is that considerable business was placed for first quarter 1925 shipment, and this without any coaxing on the part of producers. None of the individual purchases was spectacular in size, but nearly all consumers were represented and, compared with some of the business to which steel mills had become accustomed of late, the size of individual orders was liberal.

Prices, of course, are hardening, and, taking all steel products in a lump, it may be said that buyers have to pay about $3 a ton more than on Nov. 1. This, however, is merely recovering the ground lost by sellers during the period of slowly drooping prices and does not denote any out-and-out advance over the levels that prevailed before the market became the ragged affair it had been until a few days ago.

It is interesting to note that the smaller independents are not waiting for guidance in their price policy by the leading interests. A prominent Ohio sheet roller announced this week a 4.75c. price for full-finished automobile sheets. General advances in full-finished sheets are looked for, although quite a few small rollers are still provided with cheap sheet bars and eager to fill their order books. Cold-rolled strip steel mills opened their order books on Monday for first quarter commitments on a basis of 4.15c., Pittsburgh, as compared with 4c. quoted freely up to the first week in November.

Steel consumers should not misinterpret the character of these advances, if they may be called so. Much of the business that came to the steel mills during the months immediately preceding election was highly unprofitable. The prices now going merely denote stepping out of the red ink stage. They do not reflect any rush of orders which, indeed, has not yet come to pass. The next four weeks will show whether volume of demand is really expanding to a point where producers can risk real price advances. So far steel must still be considered cheap as compared with its own price record and that of other staples.

Pig Iron.—Further price advances are overhanging the market. Sellers are extremely reserved. Blast furnace representatives who have heretofore named $19.50, valley basis, for No. 2 foundry are now talking $20, and say they don't know how long this figure will apply.

Aluminum.—Aside from the routine activity of the British importing interest, foreign producers of aluminum appear to be little interested in the American market. Very seldom one hears of Continental producers making any determined effort to go after American business. The sole domestic producer continues the policy of protecting contract customers and refraining from quoting open market prices.

Copper.—Copper, in its post-war efforts to attain a more normal price level, has before this reached 14c. and slipped back again, but this time the market shows a much healthier appearance. Good demand for automotive brasses is noted.

Flex-Hyde Acquires Marathon Tire Plant

AKRON, Nov. 19—Purchase of the Marathon Tire & Rubber Co. plant and equipment at Cuyahoga Falls has been announced by Frank B. Burch, president of the newly organized Flex-Hyde Rubber Co. The amount received by the trustee in bankruptcy for Marathon was $100,001. The company failed early this year for nearly $500,000.

Marathon formerly produced approximately 1000 automobile tires a day.

The Flex-Hyde company will not attempt at present to manufacture tires. It will produce leather goods.

Calendar

SHOWS

Dec. 1-13—Montevideo, Uruguay—Second Annual Motor Show, under the auspices of the Centro Automovilista del Uruguay, held in buildings of the Associacion Rural del Uruguay.

Dec. 5-14—Berlin Automobile Show.

Dec. 6—Cordoba, Argentina, Second Annual Automobile Show, under the direction of the Cordoba Automovil Club.

Dec. 6-7—Brussels Show, Palais du Cinquantenaire.

Jan. 2-10—New York, National Automobile Show, under the auspices of the National Automobile Chamber of Commerce, Bronx Armory. Open to the public except on Jan. 2 and 3 which are trade days.

Jan. 17-24—Cleveland, Annual Automobile Show.

Jan. 23-31—Chicago, National Automobile Show, under the auspices of the National Automobile Chamber of Commerce, Coliseum and First Regiment Armory. Open to the public except on Jan. 23 and 24 which are trade days.

Jan. 25-31—Chicago Annual Automobile Salon.

Feb. 7-14—Kansas City, Mo., Annual Automobile Show.

Feb. 21-28—San Francisco, Pacific Annual Automobile Show.

March 7-14—Boston, Twenty-third Annual Automobile Show.

RACES

Nov. 24—Los Angeles.

CONVENTIONS

Dec. 2—Annual Meeting National Highway Traffic Association, New York City.

Dec. 4-5—Fourth Annual Meeting, Highway Research Board, Division of Engineering, National Research Council, Washington, D. C.

Dec. 9-11—Fifth Annual meeting, American Petroleum Institute, Texas Hotel, Fort Worth, Tex.

Jan. 5—New York, Convention under the auspices of the National Automobile Dealers Association, Hotel Commodore.

Jan. 5-9—Chicago, Road Show and Convention of the American Road Builders Association.

Jan. 26-29—Chicago, Eighth Annual Convention of the National Automobile Dealers Association, Hotel LaSalle.

June 22-27—Summer convention of the Automotive Equipment Association at the Broadmoor Hotel, Colorado Springs, Colo.

S. A. E. MEETINGS

Dec. 11—Indiana Section, Aviation Development, Major E. L. Hoffman; Superchargers, Dr. F. A. Moss.

Dec. 15—Cleveland Section, Development of Clutches, Ernest C. Wemp, Long Manufacturing Co., Old Colony Club, Hotel Cleveland.

Jan. 15—Indiana Section. Lubrication and Crank Case Dilution, W. S. Sparrow of the U. S. Bureau of Standards.

Jan. 19—Cleveland Section, Preparation of Fuel Charges and Detonation. Arthur H. Denison, Weger Motor Co., Old Colony Club, Hotel Cleveland.

Jan. 20-23—S. A. E. Annual Meeting, Detroit.

Feb.—Indiana Section, Automobile Finishes.

Feb. 16—Cleveland Section, Electrical Instruments and Measuring of Chassis Tests by Means of Them, J. H. Hunt, General Motors Research Corp., Old Colony Club, Cleveland.

Mar.—Indiana Section Developments in Transmission.

Mar. 16—Cleveland Section, Road and Riding Ability, Harry Horning, Waukesha Motor Co., Old Colony Club, Hotel Cleveland.

Apr. 9—Indiana Section, Talk by F. E. Hunt, vice-president of the General Motors Research Corp.

Detroit Railways to Use More Buses

DETROIT, Nov. 19—Detroit United Railways, the interurban electric railway company serving many cities in the State and Ohio out of Detroit, has taken a further step toward coordinating motor bus and railway service by terminating all its electric service at the outskirts of the city and using buses for bringing passengers to and from the main terminal on Jefferson Avenue.

Under the company's plans it will have a fleet of 50 buses operating between the terminal and the several points at the city limits, where its own tracks stop. Formerly the interurban cars came all the way into the city, using the Detroit owned tracks from the points where their own rights of way left off.

Because of congestion due to the regular city trolley service and automobile traffic generally, the last or first stage of an interurban trip has been slow and actual running time between cities much lengthened.

By using buses from the terminal, the company plans to avoid traffic to a large extent because of the greater elasticity of bus service. As the greatest congestion in the city is over the streets normally used by interurbans, it will be in a position to greatly reduce its running time and at the same time will relieve to a large extent this congestion by keeping the heavy interurban cars out. The company will also save heavy rentals which it is now paying the city for use of the tracks in reaching the downtown terminal.

Start of the combined bus and rail passenger service is scheduled for Dec. 1. The 50 buses will be delivered by that time and started in operation immediately. They are of single deck type, with a seating capacity of about 40, and will be made by the Yellow Coach Co. of Chicago. They will operate only in the city, carrying passengers on a combined bus and rail ticket.

The buses are to be operated by a subsidiary of the Detroit United Railway called the Peoples Coach Co. This subsidiary is already managing the operation of several inter-city bus lines, which are being operated in conjunction with the regular interurban service. Under the plan as filed with the State Utilities Commission this subsidiary would operate through buses to many cities of the State, opening up territories which hitherto have had no passenger service of any kind.

N. A. C. C. Plans Busy Time for Mission from Mexico

NEW YORK—Plans for the visit of the Mexican Automotive Mission, composed of distributors and dealers, to the New York Automobile Show, commencing Jan. 2, have been announced by the National Automobile Chamber of Commerce.

The program of activities of the mission, from Jan. 5 to 9, include conferences on the Mexican highway problems, sales and distribution in Mexico, the financing of motor sales and other trade problems. Conferences will be held with manufacturers of the various automotive lines.

Plans for the visit of the mission here are being made by George F. Bauer, secretary of the International Trade Committee of the chamber, and by Gustavo Alana, editor of *El Automovil en Mexico.*

OHIO BODY PLAN APPROVED

CLEVELAND, Nov. 19—At a special meeting here stockholders of the Ohio Body & Blower Co. approved the recapitalization plan recently announced.

Automotive Payroll Larger in Illinois

CHICAGO, Nov. 19—An expansion of 10.8 per cent in the automotive manufacturing payroll in Illinois in September, as compared with August, is indicated in the October industrial review of the Illinois Department of Labor. This was the second successive month since the depression that registered a pleasing increase in employment in the automotive production field of this State.

The gain during August over July was 0.9 per cent. July compared with June, showed a loss of 7.2 per cent in employment.

While it can be seen that the movement was steadily forward for the two-months' period, automotive employment in Illinois at the close of September was about 22 per cent under the same time last year. It is not likely that the difference of 22 per cent will be made up in the remaining two months, but it is expected that the curve upward will continue somewhat, depending on post-election prosperity.

Approximately the situation found in Illinois would possibly be found in other States of the Mid-West, although with large automobile factory centers in neighboring States included the picture would be considerably improved. Automobile factories have been expanding more than accessories, which composed the bulk of the Illinois report.

On the basis of the Illinois survey the automotive industry is much to the fore in the movement away from the depression. With the exception of watches, clocks and jewelry the automotive employment gain from the first of August in this State to the first of October was greater than that of any other classification.